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August-September, 1943 35 Cents Vol. 36, No. 7

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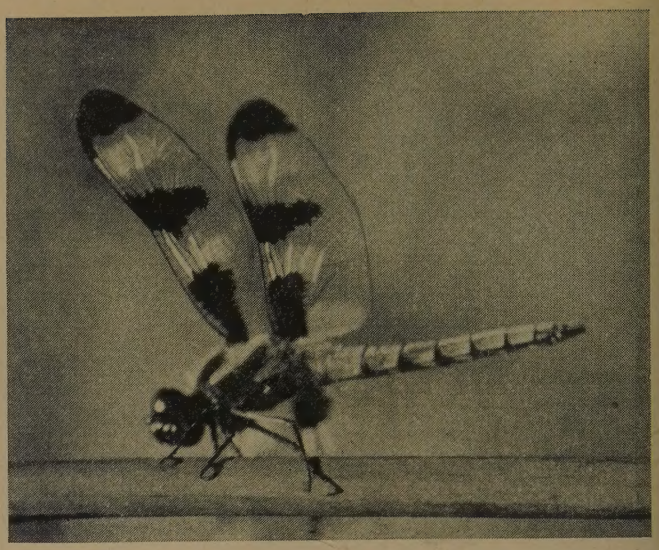
Camera Trails

By NORRIS W. HARKNESS



"Nemesis" by Lloyd G. Miller of Chicago. The shot was made with the stem vertical but the idea of the title seems best expressed by this position.

Using the Camera Wisely

The days of late summer are among the finest of the year for the photographer. Except for part of August and an occasional short period later, it is not too warm for long hikes or even for working in the darkroom, and the skies are likely to have good clouds to hang over attractive landscapes. Many of us will be taking vacations from the high pressure of war work, civilian furloughs that will put us into the best possible condition for the efforts of the months ahead.

Probably we shall be doing less traveling than has been our custom, but that need not keep us from getting more from the days off by using our cameras to help us get the maximum benefit and relaxation from the outdoors. Most of us need an objective when we wander off into the country, and the camera supplies not only a reason but a most excellent companion for one or many days. It never talks back, it does what we ask of it—provided, of course, we have studied its peculiarities enough to show it who is boss—and it lets us take home and keep the finest parts of days that are unlike our usual routine. An otherwise good vacation will become a splendid one if we take the camera along.

But its part in the satisfaction we get from those precious two weeks—or from a single day, for that matter—will depend upon the results we get. Poor pictures carelessly made will reduce the fun of the day, but good ones will add immeasurably to it. And good ones are just as easy to make as the other kind. The difference is a bit of thinking.

We might list the requirements of good pictures more or less this way:

First, the minimum of equipment. A heavy pack is small burden for the first few minutes of a hike, but an extra pound is a tremendous load after a few hours. We will need the camera in a case that will protect it from dust and mechanical damage, a lenshood, a medium yellow filter, a meter or an exposure calculator, and for close-up work a supplementary lens and a tripod. But check over what you took along last time and see what you needed and did not have when you wanted it. Then see what is in the pack that you did not use and leave those gadgets at home.

Then, for the actual picture making, the first need is for a thinking eye. Film is scarce, and will continue to be for the remainder of the year, so you must think enough about the shot before you to be sure you really want it after it is made. Random shooting in August will leave you no material in September. With that eye at work (using the viewfinder will help) look over the scene that attracts you and try to see not only the central object but also the other things in background and foreground that might spoil its effect. Search it from different viewpoints to find which gives exactly what you want, and then check it again before you shoot. It is dreadfully easy to find the troubles *after* the print is made.

With the viewpoint decided upon, and with a definite reason for choosing that point rather than any other, check the depth of the scene that you want sharp. Usually you will want everything as sharp as possible, although in some cases it is best to make the near or far distance less crisply focussed, so a fairly small stop is to be preferred. F/11 or f/16, and the focussing scale set on perhaps the twenty foot mark, will almost always get everything perfectly and still allow a shutter speed of $\frac{1}{50}$th second, which will stop any reasonable action.

Then, with the framing of the picture settled by the viewpoint, the aperture decided upon for the sharpness wanted, and the shutter speed determined by the stop and the light, all you need is to make the exposure. *But* it must be made at exactly the right time if the result is to have its full thrill—the picture must have the kind of timing that makes people say—"Gee, you were lucky to be there just then!" Shooting just because you happened to be there makes pictures that lack the small something that we call timing, which makes the difference between a good photograph and a real picture.

Finally, when you get the films back in the darkroom, give them the best possible processing according to your established technique and make the best print you know how.

Sometimes, however, two steps in the above list need to trade places. If the subject is moving, you may need to check the shutter speed first and set the diaphragm afterward to get an exposure fast enough to stop the motion. Often you will have to compromise between the speed you think you need and the depth of sharpness you would like to hold, but if you think through each setting of the camera adjustments and definitely make a decision for each of them, you will not do badly.

Note to the Discouraged

From all Washington indications amateur photography is now at the lowest point we can expect it to reach. Supplies of film and paper and chemicals are not expected to be reduced below present levels, and there seems to be some hope that small quantities of strategic metals may be available for the manufacture of some equipment items in the last three months of 1943.

There will undoubtedly be no new cameras and en-

largers for civilian use until much later, but the gradual increase in the metal and other stocks indicates that we have a slightly encouraging picture before us. Do not get your hopes too high, but do not be downhearted either.

QUESTIONS AND ANSWERS

E. J. N., Lancaster, Pennsylvania, asks: "How much should a negative be enlarged to make the best possible picture?"

ANS.—A whole book could be written on that one, and the arguments it would start would never end. However, to reach a basis for consideration of some one picture, the fundamentals involved include the distance from which the print will be seen, the effect desired, and the type of subject. In general, the print should cover at its expected viewing distance approximately the angle of view that the scene photographed did when the shot was made, but there are too many cases where one reason or another makes this difficult for us to call this statement a rule. It will apply for almost any print that will be held in the hand for inspection.

A mathematical rule for the problem says that the ratio of enlargement should equal 16 divided by the focal length of the camera lens, which would be 8X for a two-inch lens and about 3¾X for a 4¼" lens. This is based on the best perspective, and makes prints that seem most natural. If enlarged less, the individual objects lose in impressiveness and if the enlargement is much more, there is likelihood of distortion. The focal length of the lens is more important as a factor than the size of the negative.

S. E., Boise, Idaho, asks: "What is the best ratio of highlight to shadow brightness in making portraits?"

ANS.—Again the effect you want is the vital factor. A so-called glamor picture with brilliant highlights and black, empty shadows will require far more difference between the two extremes than will a more flatly-lighted child's picture. Most portraits, however, are best when the ratio is held to two or perhaps four between the brightest spot and the darkest place. In using a meter held very close to the face, if the highlight reads 100, the shadow should be at least 25 and preferably 40 or 50. Probably the greatest fault in amateur portraits is too great contrast. It can be checked visually if you use a deep blue viewing glass to study the effect of the lighting. It will show the monochrome effect for your film and allow you to judge the depth of the shadows and the amount of detail that will show in the print.

T. L. P., Omaha, Nebraska, asks: "What happens in the fixing bath?"

ANS.—The chief purpose of the fixing bath is to remove from the emulsion the silver that was not used to form the image. Naturally, the film or paper is coated evenly with an emulsion of gelatin containing silver salts and various chemicals and dyes. The picture uses some of the silver, which is converted to metallic silver under the combined action of the light and the developing agent, but the greater part of the original silver remains and would turn black if it was allowed to stay in its salt condition. The hypo in the fixing bath attacks the unexposed and undeveloped silver without affecting the image. After ten to fifteen minutes in the fixing bath, the image is unaffected but the unwanted silver has been removed. Hardening chemicals are often added to the bath to make the emulsion less subject to mechanical injury, and various acid buffers help to keep the bath in its original acid condition.

L. I., Manchester, Vermont, writes: "You have given the table before but I have lost the copy of Nature Magazine that contained it. Will you please give again the comparison between the regular aperture marking scale and the one on my foreign camera?"

ANS.—The scales are given below.
American f/ 2 2.8 4 5.6 8 11 16 22 32
Foreign 1.7 3.5 6.3 9 12.5 18 25 36
Occasionally scales made in America are marked f/ 4.5, 6.3, 8, 11, etc., but the difference is small between these and the regular American scale. To be accurate, f/4.5 is half way between f/4 and f/5.6, and f/6.3 is about 25% less than f/5.6.

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

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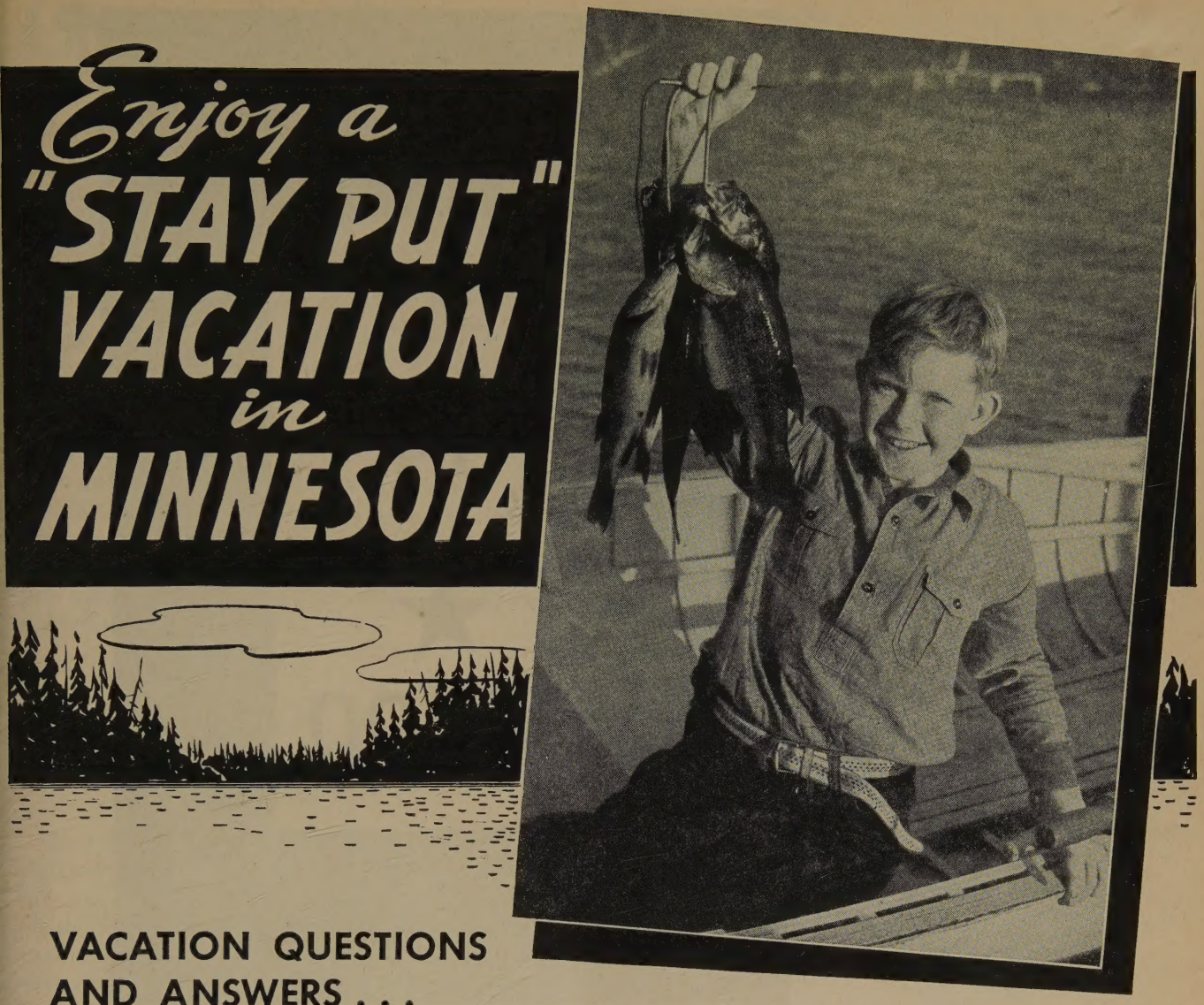


VACATION QUESTIONS AND ANSWERS . . .

QUESTION: Is it patriotic to take a vacation this summer?

ANSWER: *Certainly it is! In fact Government officials recommend taking the right kind of a vacation.*

QUESTION: What is the right kind of vacation?

ANSWER: *One that minimizes the use of critical materials and vital transportation in reaching vacation spots . . . and the kind of vacation that will build you up and renew your energy for war work.*

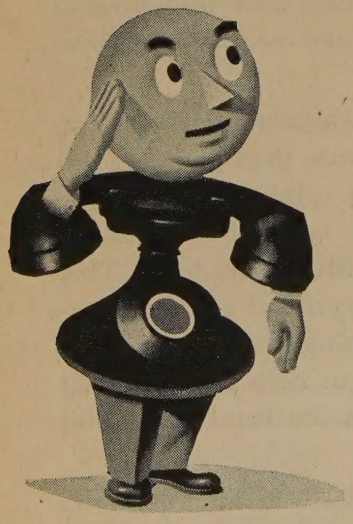
QUESTION: What type of transportation shall I use?

ANSWER: *When the distance is not too great, travel by motor car, if your A Card ration permits . . . and use B or C cards only as authorized. Use trains or busses sparingly on week ends. Cooperate with the efforts of your Government to maintain war transportation schedules.*

Of course, you can take a vacation! You probably need one more than you ever did in your life. Select a cabin in the woods. Stay put! Fish, canoe, sail and swim in the sky-blue waters of a Minnesota lake. This way you are not using critical war transportation, but you are getting that much-needed change and rest. Let us help you pick that ideal vacation spot in the Land of 10,000 Lakes.

Write for free illustrated booklet, "Minnesota Official Resort Guide". Address Dept. N-8, Minnesota Tourist Bureau, State Capitol, St. Paul, Minnesota.

Minnesota - Land of 10,000 Lakes



A Flag with 46,200 Stars

THE service flag of the Bell System had 46,200 stars on May 1. It has a lot more now. Telephone men and women are serving with the armed forces everywhere.

Those who are right in the middle of the fighting realize especially the importance of the telephone job back home.

"Tell the gang," their letters say, "to keep on plugging.

"We wouldn't have the stuff for fighting if the rest of the Bell System wasn't sticking to the job and pushing through the calls that get things done.

"Takes team-work to win a war — especially a big one like this."

BELL TELEPHONE SYSTEM

★ *Your continued help in making only vital calls to war-busy centers is more and more essential every day.*

Contents Noted

One of our scouts up New England way reports that a grade-school discussion of national bird emblems found one Westerly, Rhode Island, youngster taking exception to the American Eagle as our national emblem. The eagle he said was always pouncing on someone else, and "had its claws out grabbing something that didn't belong to it." Asked to suggest what he thought would better represent the United States, the young man was not without resource. After a moment's thought he proposed the skunk—because "it is slow to argue, wanted to be left alone, did not pick a fight, but if anybody attacked him—Oh Boy!" He might have added that the skunk also gives warning before it attacks. While we still think that the eagle has qualities of courage, strength and nobility that make it an appropriate emblem, the young man from Westerly gets A for some mighty straight thinking about a much-maligned animal.

According to the public relations department of the duPont Company, coal, one of Nature's most common raw materials, is potentially richer in rubbers than all the islands of the East; more bountiful in fibers than all the Japanese silkworms; wealthier in colors than the rainbow; and abounding in curative medicinals. This should be of interest to caterpillar-browed John L. Lewis, who, as this is written, is still glowering in the face of public opinion and lending no aid whatsoever in the rather important business of winning this war.

That Nature provides signal help in the reconstitution of men who have suffered from the rigors of battle appears proved by a clipping that comes to hand from a New Zealand newspaper. Men from the South Sea fighting, nervous and restless from the hellish places in which they have existed and fought, have provided psychiatric problems. Under the direction of Major Merrill Moore, psychiatrist, conchologist and naturalist, the men have been given every opportunity to enjoy the peace and beauty of the New Zealand countryside. Also, barrels of sea shells from the beaches of the island, which is one of the richest in the world in the variety and beauty of its molluscan life, have been brought to the convalescing soldiers. Some of them have developed a scientific interest, others have found pleasure in the beauty of the shells, and others have used them in handicrafts. Almost all have reacted to the shells in a positive way, and have found them an aid to rehabilitation.

Evidence accumulates that the numbers of abandoned dogs (and cats, too), become wild out of necessity to exist, are increasing rapidly. Apparently many people, unable to supply food for their dogs, are, out of a perverted humane impulse that forbids their having the dogs humanely disposed of, turning them loose on the countryside as far from home as gas rations permit. There are some known cases when particularly low forms of human life have thus abandoned dogs left in their care by men in the armed forces. Man's best friend, out on his own, becomes a wily animal, hard to catch. He becomes a menace to both human and wild life, and conservation officials are recognizing this situation as serious. Nor is it confined to rural districts. Cities are encountering the problem, too. Just recently, early one Sunday morning, we saw a pack of fourteen large, nondescript, tagless and dirty dogs making their way up a main street in the Georgetown section of the District of Columbia. They seemed to know that the dog-catcher does not work Sundays for there was nothing furtive about this troop.

Taking his place in the first rank of the great men of his race, Dr. George Washington Carver passed away a few months ago. During more than four decades he quietly sought solution to the problems of the southern farmer, finding it in the discovery of many uses for the hitherto waste products of peanut and sweet potato culture, and other farm products. Yet when the time came for him to quit his laboratory for good he said that he had only scratched the surface. To bolster that conviction, he left his life savings of thirty-three thousand dollars to The George Washington Carver Foundation, established in 1940 to carry on the research work he had commenced, complete projects he had inaugurated and generally to devote itself to the problems of agriculture. With headquarters at Tuskegee Institute, Alabama, and with a specific program, this Foundation is worthy of the support of all Americans, both as a tribute to the man whose name it perpetuates and as a practical way of answering some of the many questions that still remain unanswered.

R. W. W.

"... coming into my room where I had left my suitcase open on the bed, ... I found Roddy curled up in it."

On a stone from the same land over which he romped are cut the words—

"Roddy—a Good Dog"

Illustrated by Athos Menaboni

By VIRGINIA TERHUNE VAN DE WATER

THIS IS NOT a dog-story. I have neither the skill nor the imagination to write such. I wish I had. This is only a brief and belated tribute—or, perhaps, just a sketch of the best dog I ever knew.

I have often wanted to write about him, but could not. Now, perhaps because I am as old for a woman as he was for a dog, I find I can do so. (I am told that one year in the life of a human being is equal to seven canine years. If so, I, as a human, am not much younger than Roddy was when he died.)

". . . up to the last year of his life he would chase a ball over the turf with the abandon of his puppy-days."

Looking back, it is strange to remember that, when he first came, I was almost appalled at the thought of owning a *small* dog. My only other dog—given me when I was a girl—had been a large English setter. My father always had pointers, for hunting. My brother's dogs were the Sunnybank collies—beautiful, dignified creatures. So when my son and his wife made me a present of a *little* puppy, I wondered what I would do with him.

But only for an instant. Three minutes after he was set down on the floor in front of me, I loved him. And I felt immediately that the sentiment was mutual.

"I declare," exclaimed a member of the family, "he knows already that he belongs to you!"

Certain it is that, when I picked him up, he cuddled down in my arms with an abandon that warmed my heart.

At this time our country was in the first world war. My son and his wife knew that I would be very lonely. The sons who lived with me had enlisted as soon as war was declared; one in the Navy, the other in the Marines. Sorrow followed these first months, and loneliness that, but for the dear young couple I have just mentioned, would have been desolation. And one of the most potent panaceas provided by their thoughtfulness was Roddy.

As he was Scotch we named him Roderick Dhu; shortened to "Roddy".

In spite of his Scottish terrier pedigree, I was told that he was not pure Scotty, but had a strain of Cairn. That made no difference to me, if it did make him, perhaps, smaller than the average Scottish terrier, and sprinkle his coat with gray hairs. To me he was just the right size and color.

Of course every dog lover thinks that his own especial animal is the best of all animals. I did not *think* that of mine. I *knew* it. And I still know it. The phrase he loved to hear were the three words—"A good dog!" And if any canine ever deserved them, he did.

We had been, as a family, in the habit of spending at least four months of the heated term in our country home in northern New Jersey. In that summer of the war we found it unwise to do this regularly, so we left the city only for week-ends. Occasionally we went by public conveyance, and, for Roddy's use on such excursions, I procured a dog-carrier. The puppy hated it at first and, put in at one end, promptly jumped out

at the other. Yet when, after two trips to the country, he learned what the carrier signified, he welcomed its appearance and sat down by it, patiently waiting until the too-slow humans were ready to start for what he evidently considered Paradise.

Later in the season, we changed our habits of travel and, instead of using ferry and trolley, drove to the country each week in our Ford. Once, when we were going elsewhere in the Ford, we left Roddy at home. His eyes, as he saw us depart with our suitcases, were tragic. Someone has said that, to a dog, every parting is a death, as he cannot know that there will be any reunion. At all events, this going-away made a never-to-be-forgotten impression on one small animal. I appreciated that fact when, the next Saturday, coming into my room where I had left my suit-case open on the bed, preparatory to packing it for our usual motor-trip to the country, I found Roddy curled up in it. As he looked at me I found myself assuring him hastily, and almost apologetically, that this time he was to go with us.

He was a delicate little creature during the first year of his life, and I almost lost him—not from disease but from the verdict given me by a vet to whom I had taken him. This man kept him for some hours' examination, and, when I called for the patient, paid my bill and asked for directions as to medication and care, the man's remark took my breath away.

"The best thing you can do with that animal," he said roughly, "is to *plant* him! He's no good and never will be."

To other dog-owners who may have heard such a brutal verdict I would say that the condemned animal lived for more than ten years.

But he might not have lived had it not been for the wise advice of the son who had given him to me.

"We'll see a doctor at the S.P.C.A.," he said sternly. "We're not going to take one man's verdict."

So we bore Roddy off to the S.P.C.A. I, having heard one pronouncement of doom, was too much of a coward to risk hearing it repeated. I sat outside in the car while my son carried the puppy into the building. He was gone for some time, but, when he returned, one look at his face sent my spirits up.

"The doctor says that there is no reason Roddy should not be cured," he told me. "It will mean care—but he's worth it."

Worth it! I held him close and felt as if he had been returned to me from the jaws of death—or from the hands of a death-dealing vet. Which only proves that it may be a fatal error to take one man's opinion on any subject—especially on a subject in which one's heart is involved.

Stories about dogs often tell of remarkable acts of valor or heroism performed by the protagonists—such as swimming out to rescue a drowning master, or dragging from the crib a baby asleep in a burning house. I do not doubt the truth of many of these stories—yet, I fancy that with dogs, as with men, some of the finest heroism is not spectacular. Such heroism was Roddy's.

For instance, there was the time when his jaw-bone was broken. He was lying asleep on the turf at Kanesata, our country home, near the garage where a gasoline truck stood after our storage tank had been filled. The day was warm, and the truck cast a kindly shade in which the Scotty stretched himself to rest. The driver stayed so long in the kitchen, gossiping with the maids, that the small dog fell asleep. The driver, perhaps startled by discovering how much of his boss's time was being wasted, jumped into the car, stepped on the accelerator and put the engine into reverse so suddenly that, before the sleeping dog was aroused to appreciation of his danger, the rear wheel had struck his jaw-bone.

I was absent when the accident occurred. Returning to my house a few minutes later, I asked my usual question of the maid who hastened out to meet

"He was a happy little dog, and, although he lived to be what is considered old, he never lost his puppy habits of playing."

me, revealing by her looks that something was wrong.

"Where is Roddy?" I asked.

"Oh, please ma'am," she burst forth, "I don't know! But he's hurt!"

Then she hurriedly explained what had happened, telling me that, as soon as he was struck, he had run up on the veranda, where I usually sat, and, after one look at my empty chair, had rushed down into the woods towards the lake.

"I called and called, and looked everywhere, but can't find him!" she quavered.

As I passed the veranda steps in starting towards the woods, I saw a trail of blood, and shuddered with a sickening fear.

I called Roddy, and in a moment saw, coming through the underbrush, the small gray figure, head drooping, blood dripping from the lower jaw, but in his eyes that never-failing expression of love.

Nor did he ever lose that expression in spite of his agony and fear. My brother, whom I summoned, hurried from his house next door and, after one glance at the Scotty, telephoned to two veterinarians. He held Roddy while the men examined the fractured jaw. It could be set, was the verdict, but it was not certain that it would heal unless the animal could be kept docile. The broken bone must be in a splint for six weeks; and all food must be administered through a medicine dropper. Few dogs would submit to this treatment.

"When he had to have the dressings changed, he kept his eyes fixed on his less brave owner."

"This dog will!" I affirmed.

The surgeon looked at my brother who knew almost as much about dogs as he did.

"What do you think?" he asked.

"That my sister is right. Roddy will do anything she wishes him to do."

His opinion was proved correct during the six weeks that followed. My brother urged me not to witness the operation, but he, himself, continued to hold the little animal during the painful ordeal.

"He never even whimpered," he told me afterwards. "He's a grand little dog!"

Nor did he whimper through the tedious summer weeks that followed. When he had to have the dressings changed, he kept his eyes fixed on his less brave owner. During the distressing process of slipping a tube between the jaws and administering liquid nourishment, drop by drop, he never whined. And when, at last, the surgeon pronounced the bone knit, and removed the bandages, the ex-invalid pranced with joy and was, once more, like a care-free puppy.

After that experience, he had a way of straying through the hedge between my home and Sunnybank to visit my brother. At first I was afraid that the collies might pounce upon him, but, as their owner explained to me, they were too gallant to attack a little dog—especially such a dignified little dog as Roddy. His manner towards them was amusing to us who watched him. He allowed them to approach him, and looked at them with approval, but never for a moment would he show that he considered them his superiors in size or importance.

He was a happy little dog, and, although he lived to be what is considered old, he never lost his puppy habits of playing. The lawn at our country-place was his favorite romping ground, and up to the last year of his life he would chase a ball over the turf with the abandon of his puppy-days.

We went to our city home every autumn, and, for several days after our arrival in town, Roddy was much depressed. Then he reconciled himself philosophically to the substitution of long walks on Riverside Drive for the delightful excursions in woods and fields. The only thing that depressed him were the occasional absences of his owner. When I was away for a few hours he would lie inside the entrance to the apartment, his nose close to the crack under the door, whiffing and listening wistfully for my hoped-for return. Such devotion is humiliating to one who knows she does not deserve it. Perhaps it is only to a dog that any human being seems perfection.

The average person may not believe that dogs have a sense of honor and readers may scoff when I declare that Roddy had such a sense. If a plate of sandwiches, or even an open box of candy, were left in the room in which he was alone, he never touched either. It was not that he did not want them. His queer little mouth might water at sight of them, but he obeyed strictly the gentle admonition—"Do not touch!" even

if the person uttering the words went away and left him alone with the tempting delicacies. While telling of his sense of honor, I may stretch my reader's credulity to the breaking-point when I say that he had also an intuition regarding the character of certain persons. As a rule he was the polite little host to any callers. But there was one exception—and his resentful growls at a certain man's presence were justified to me, at least, when, later, this man cheated me in a business matter. And Roddy's intuition was almost uncanny in his ability to understand my emotions. If I were alone and, without speaking or moving, would let my thoughts wander to some sad subject, my dumb companion would rise from his place at my feet, and, putting his paws on my lap, gaze up at me lovingly, then lay his head upon my knee with a regretful sigh. I have often wished that some humans had such powers of sympathetic understanding!

One autumn I left Roddy for three months. I had a Scotch cook who loved the little dog in a touching way. I used to think that it was because they were both Scotch. She must also have had a great respect for him, for she always addressed him and spoke of him as "Mister Roddy." I could never persuade her to omit the title. "He understands and likes it," she would insist. And it was she who remained in my apartment to look after my sons—and "Mister Roddy"—while I was in Europe.

I wondered, thinking of the maid's devotion to the little dog, if he would be so accustomed to my absence, and her care of him, that he would be less happy than I hoped when I came back. So when I entered my apartment on my return I was prepared to call my pet's name and see what his reaction would be.

But I had no chance to call. As the door opened, there was the sound of scurrying canine feet rushing down the hall, and, as I dropped down on a chair right inside the entrance a little gray body *hurtled* (no other word describes it) into my lap, a wet nose was thrust into my neck and something almost like sobs convulsed the shaggy frame. Holding him in my arms, I was ashamed to find myself shedding tears, until, glancing up, I saw Janet—the Scotch maid—weeping unrestrainedly.

It was several years after this that, when walking with my little dog, I noticed that he trotted more slowly than usual and with some difficulty.

"What's the matter, Roddy?" I asked him. I had talked with him so often and so confidentially for more than ten years that I did not think of him as a dumb animal. "Can't you walk a bit faster? You're not growing old, are you?"

He trotted a little faster, but his natural exuberance was lacking.

A few days later, we discovered what the matter was. There was no cure. The vet who had attended Roddy ever since the day that we had taken the then-invalid to the merciful S.P.C.A., explained that the pain that was already starting would increase to agony. Nothing could be done to avert it—nothing but the merciful sleep that man must not administer to man in similar conditions.

The little body, freed from pain, was laid tenderly under the turf of the lawn on which he used to romp. And on a stone from the same bit of land my son cut the date of the sleeper's birth and death, with the words that had been sweet music to canine ears—*"Roddy—A Good Dog."*

Somehow, somewhere I shall have him again. I remember that other home-coming when rushing canine feet and ecstatic greeting added to the joy at my journey's end.

I intimated this once to a Puritan-minded woman. She shook her head.

"You remember," she argued, "the Bible text that says—'Without are the dogs'?"

"But that is not what that text means," I declared.

"Then what does it mean?" she demanded severely.

"I don't know," I said—"but I suspect that it refers to two-legged dogs."

She smiled patronizingly, but I wanted to cry.

Yet I try to forgive her—for she never knew Roddy.

★

Hawk's Day

By WILLIAM D. SCHORGER

Life in the dawn;
the hawk cast up
His wings against the moving lanes
Of wind; the currents caught the vanes
Extended; suddenly the cup
Of dawn light overturned, the world
Became a golden, glowing thing;
A bird took heart, began to sing
Among the grasses frost had curled.

Now in the dusk,
wings sweeping stilled
Night air, the hawk returned, his flight
A shadow in the fading light
Above the trees the dark had filled;
Upon the ledge, ruffled plumage dropped
In order; talons, caught with hair
And darkened blood, relaxed; the dare
That light had brought was gone; day stopped.

From that motley half of the earth's greenery that we know as weeds comes—

Live Gold

Photographs by Howard A. Sands and Alfred A. Monner.

By ELISE CLEMES

"YES, SIR," Father remarked, "that's the prettiest stand of dog-fennel I've found in years." We had stopped at a farm near Marysville, Washington. Mr. Jensen, the owner, planted a foot on the running-board and squinted at us.

"Dog-fennel, that nasty-smelling weed over by the hen-house? You want to *pick* it!"

The farmer was polite while father explained that he was a botanist who collected pollens used in extracts for hay-fever treatment. But as we drove away with our cargo of dog-fennel stowed in the rear of the dusty little pick-up truck, Mr. Jensen looked amused.

Ten summers helping my father collect pollen have taught me that many people react as did Mr. Jensen. Pollen-collecting strikes them as pretty silly business.

To us it is the most natural thing in the world; ordinary as pruning a hedge or pulling radishes from a vegetable patch. Spring, when most Nature addicts are photographing, poetizing, or smelling apple-blossoms, we are looking for squat broad-leaved plantain shoots, or crawling around somebody's cow-pasture after sweet vernal grass.

Later, when fresh-air worshipers are identifying flower specimens and sketching wild orchids, we are out hob-nobbing with the botanical underworld, the low-brow pigweeds, ragweeds, and all the fecund tribe whose pollens sow the winds with sneezes.

Since hay-fever is caused by light, wind-borne pollens, weeds producing the largest quantities of pollen are the worst offenders. This means that pollen from the commonest, most prolific weeds and grasses must be collected by the thousands of grams.

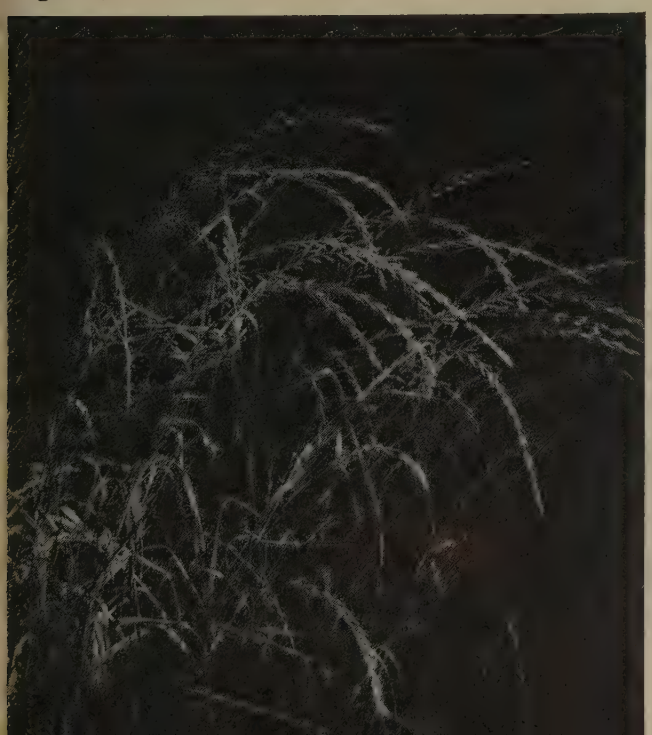
This harvesting phase of the work fills only part of the collector's schedule. Pollen from scores of less widespread plants must be collected each year, although in smaller quantities.

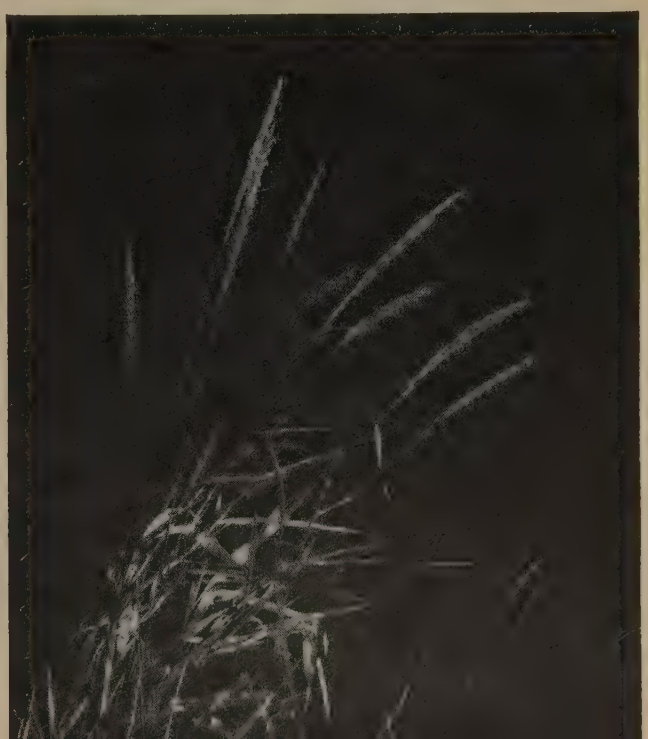
From skunk-cabbage to Easter lily, canary grass to greasewood, spinach to sugar pine—trees, weeds, grasses, shrubs—all go through the pollen collector's hopper and yield a measure of their yellow sneeze-powder.

Market requirements for pollens vary each season. This year demands have sky-rocketed due to the general wartime boom, coupled with the fact that Uncle Sam is setting up allergy centers for susceptible doughboys and sailors.

My father considers himself well-stocked if he can keep on hand about 180 different varieties of pollen. The gradations are fine and exacting. For instance, he has pollens from six different species of blue-grass,

Pollens are collected from about sixty kinds of grasses, including six different species of blue-grass, brome grass, the fescues and ryes. Below are perennial rye, left, and quack grass. Photographs by Sands.





brome grass, the fescues, and ryes, to mention a few.

He collects from about sixty kinds of grasses, the same number of weeds and shrubs, forty kinds of trees, and twenty varieties of cultivated flowers. For good measure he keeps a few grams of fern spores and wheat smut, and has even collected a little horse dandruff. However, as a self-respecting botanist, he regards this last item with some scorn.

All of the grasses and weeds are collected in about the same manner. Weeks before blossoming time we scout out the best collecting patches. Some of the same spots are revisited year after year. When blossoming begins, we move in for the "harvest."

Where a particular grass or weed grows thickly, unmixed with other blossoming plants, it can be cut rapidly with a small scythe. Orchard grass, timothy, red-top, and the bunch grasses make easy pickings. Collecting these is like participating in a pre-machine-age harvesting bee. You gather in all the blossom heads you can hold with one hand, and reap them with a scythe or sickle with the other. Bundles are tied up like small sheaves and put in the shade. Long working days are spent at this hand-harvesting during June and July, when everything seems to be blooming at once.

Each day's collecting must be placed in water before night-fall. This means twilight hours in the laboratory after a hard day's labor, arranging the perishable green harvest where it can be fooled into shedding its pollen under artificial conditions.

The freshly-cut grasses and weeds are set in cans of water over glazed paper. Twenty, thirty, perhaps fifty cans fill a room, depending on whether five-inch plants have been collected, or five-foot ones. When a day's "set" fills several rooms, a summer's day-shift lengthens into a night-shift and finds us still at work. Like the farmer who has to plant himself in the barn with a bucket when old Bess is ready to "give down," we have to wait attendance upon our chlorophyll clients when they are ready to give down, or all is lost.

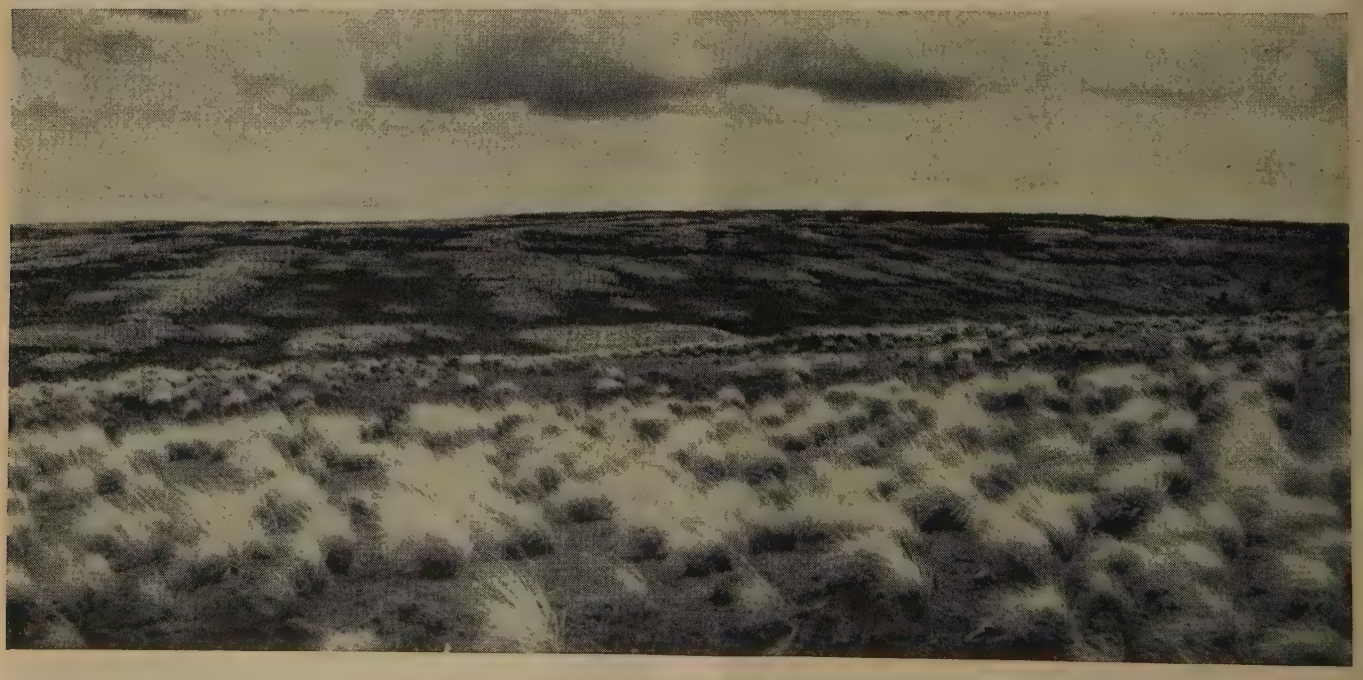
To speed up the task of watering and setting out a pollen harvest, we have developed a production-line system that would do credit to a bomber factory. Father stands at a work table and unties the big green bundles, slashes out leaves and chops stems off evenly with a hatchet.

Her junior status gives my youngest sister the easiest job, that of water-boy. As fast as she pours water into cans my other sister and I arrange one bouquet after another, and set them over newly-unrolled paper. By the time the last handful of grass has been eased into the last polished tomato can, it is usually dusk. A parting glance at our handiwork yields a bizarre sight. There in the twilight, like a florist's drunken dream, are row upon row of green, identical bouquets, neatly spaced, and sitting, ridiculously, on the floor.

Next morning we enter the laboratory on tiptoe. A gust of air could whisk away many dollars worth of pollen. We tap the heads of the nearest bouquet. If a yellow cloud is loosed, all is well. A film of pollen will soon coat the paper. A few days later we will clip the dried blossoms and brush them up along with the pollen that has accumulated on the paper. Often this dry material is stored in the rough, and sifted weeks later, after the collecting rush has subsided.

But supposing all does not go well, as frequently happens. Maybe the vegetation in the room increases the humidity to a point where wilting or mildew sets in. We find a sickening sight. Armloads of hard-won—now blighted—plants droop dismally like limp green string. We discard the useless stuff, thinking meantime

There is beauty as well as practical value to this eastern Oregon scene where the bunch-grass stretches far out to the horizon, tossed by the winds. A collector would be "in clover" in such countryside as this one.



where to look for another good patch of the same thing in a hurry, before the season's blossoming is over. With luck, a new batch of the ill-fated grass or weed can be gathered, brought in, and nursed into healthy blossom-hood, and a new year's supply of its pollen assured.

After the hurly-burly of collecting, the final sifting process is like slowing down to a tiresome walk after a fierce, invigorating sprint. The dried pollen and blossoms are put through an entire series of sieves, the last an exceptionally fine-meshed one. Great pains are taken to avoid dirt, or contaminating mixture of one kind of pollen with another. My father spends fall and winter hours in the stuffy, pollen-hazed air of a laboratory room, sifting live, golden dust free from last vestiges of chaff and fuzz.

As each variety is sifted clean it is weighed, bottled, and added to a cabinet containing pollens ranging in color from pinkish tan through the yellows to deep orange. In that cabinet lie uncountable millions of captive life germs, originally formed to fertilize plant cells, potentially capable of making susceptible people miserable, but now, paradoxically, destined for an opposite mission.

People sometimes get curious notions about our pollen-collecting. One of the most amusing occurred during a summer collecting rush when my father had rented an old hotel where we were setting out quantities of grasses.

Early and late we hustled in and out of the ancient building with armloads of "hay," cartons, cans, and paper-rolls. One evening a policeman strolled upstairs and wanted to know what we were doing. When we told him, he threw back his head and roared. It seems an imaginative housewife across the street had reported us as possible anarchists manufacturing dynamite to blow up the city hall.

Another time an elderly lady found us gathering dandelion blossoms. She wondered if we would like to exchange dandelion wine recipes with her. When we could not convince her that something different from wine was our goal she left in a huff, feeling, no doubt, that we were being stingy about a pleasant family secret.

The average observer is sure that pollen-collecting must be an easy way to make money. What could be hard, he insists, about picking weeds? As for sifting, I once heard a rural would-be collector remark, "Why I could put the stuff through my old woman's flour sieve!"

Actually, of course, pollen-collecting is easy only if you know how, and even then it has drawbacks sufficient to lick any but the rare enthusiast. Of the dozens of helpers my father has attempted to train, none ever emerged with genuine liking for the work. Several mastered the techniques, but were not interested in carrying on for themselves. This is so despite an ever-expanding pollen market, where prices range from thirty cents a gram, or less, for the commonest varieties, up to four dollars per gram for rare pollens!

Actually, a desire for profits is not enough to make or motivate a pollen-collector. He must have something more. The quality of "weed-savvy" for one thing, something that grows on him through years of association with the motley half of earth's greenery. He must understand his weeds and grasses, and love them, else he will never have the heart to seek them out when they are scarce, and toil with them where they grow in profusion. A peculiar business, pollen-collecting, and a difficult one. But, just the same, it can be fun!

A study of the countryside of eastern Oregon, which is the pollen collector's Open Road. However, he never keeps more than one eye on it, because the other is always ranging out over the fence-posts for rare blooms.

In the company of purple finches and evening grosbeaks lives—

Michael Magee of the Soo

By GRACE V. SHARRITT

This is Mr. Magee's favorite among his snapshots of his purple finch guests.

IN A SMALL garden of Sault Ste. Marie, Michigan, within a stone's throw of the largest iron ore locks in the world, and their attendant wartime activities, a banker after work hours busies himself among the birds that flock to his sanctuary. Unmindful of barrage balloons overhead or watchful planes guarding the locks along the strategic water artery, Michael J. Magee, like the whimsical station master in the film "Mrs. Miniver," continues his pursuit of a peacetime hobby in spite of incredibly changed world conditions. This hobby, or avocation, has distinguished Mr. Magee as the foremost authority of North America on the life and habits of the eastern purple finch.

What Henry Ford has been to the genus Model T, Michael Magee is to the bird with the scientific name *Carpodacus purpureus purpureus.* Twenty-five thousand, five hundred and twenty-seven are the exact numbers (at this writing) of this enchanting species that have been meticulously recorded in Magee's bird-banding journal and carefully registered in the U. S. Fish and Wildlife Service records—a record for purple finches topped by no other banding station on this continent.

During the autumns and springs of the past twenty years thousands upon thousands of brilliant claret-feathered male finches, in company with their less strikingly-dressed wives and children, have stopped in the backyard at the Soo for a meal or two of sunflower seed, only to be tagged with an identification anklet before traveling on to their winter homes or nesting-places.

Why do these finches favor the banding-traps in a town-garden of northern Michigan in preference to others throughout the country? This bird is distributed freely over most of the United States and southern Canada, its northern breeding limits in British Columbia and Quebec, its wintering resort in the Gulf States.

This was the question I asked the purple-finch wizard one warm September afternoon. We were inspecting the bird-traps in his garden. There were five ground traps. Two contained small pools of water. The garden was unbelievably peaceful, like some dim-interiored cathedral lending a brief respite from the material world. The actual trapping area was a natural woodsy enclosure—about fifty by seventy-five feet—planted in native thorn-apple, mountain-ash and black cherry trees. The entire fenced-in sanctuary measured approximately three hundred by four hundred feet. Main Street of the tremendously busy town was only a city block or so away, packed with soldiers and sailors from nearby Fort Brady. The tempo was wartime. Yet the garden where Mr. Magee knelt to open a banding-trap was serene and remindful of another way of life.

Along the garden walk golden glow and pink China asters blossomed. From the tip of a cherry tree a bird sang in a soft, warbling melody. His crown, breast and rump were gorgeously colored like a bolt of changeable taffeta, ranging from tulip-pink to sunburst and wine. In the brilliant sunshine his feathers quite dazzled the eye as the purple finch arched his wings like exquisite twin fans above his back. Imagine thousands of such birds adorning this small, tree-shaded plot throughout the years!

"How do you account for the unusual numbers of birds coming to your place?" I asked again as we walked towards a barn where the banding takes place.

"When I first began banding the finches in 1922 just a few came to my traps," he replied. "But I filled my feeders with sunflower seed and poultry feed. Each year the birds increased in numbers. Many remained to nest in the pine and cedar woodlands around the town. As the finch population increased the young returned to this area, as had their parents, to raise their families, until the birds began to average over a thousand each season."

Mr. Magee carefully placed the trap with three fluttering finches on a wide shelf in the barn as he talked. He reached for a box of file cards, then another with a wired string of bird-bands and repeated, "It was the food that brought them." This ornithologist has good reason to believe that food is responsible for the large finch census in his territory of the Upper Peninsula. Each year he foots the bill for five hundred pounds of sunflower seed to feed his birds.

April and May, he told me, are the heaviest months of purple finch arrivals from the South. But the greatest movement of the birds is during October and early November. Down they drift from the North like color-

ful autumn leaves in an indolent breeze. Occasionally one or two brave fellows spend the entire cold winter of the Soo with Mr. Magee, enjoying his hospitality, while the great rollicking company takes to the airways.

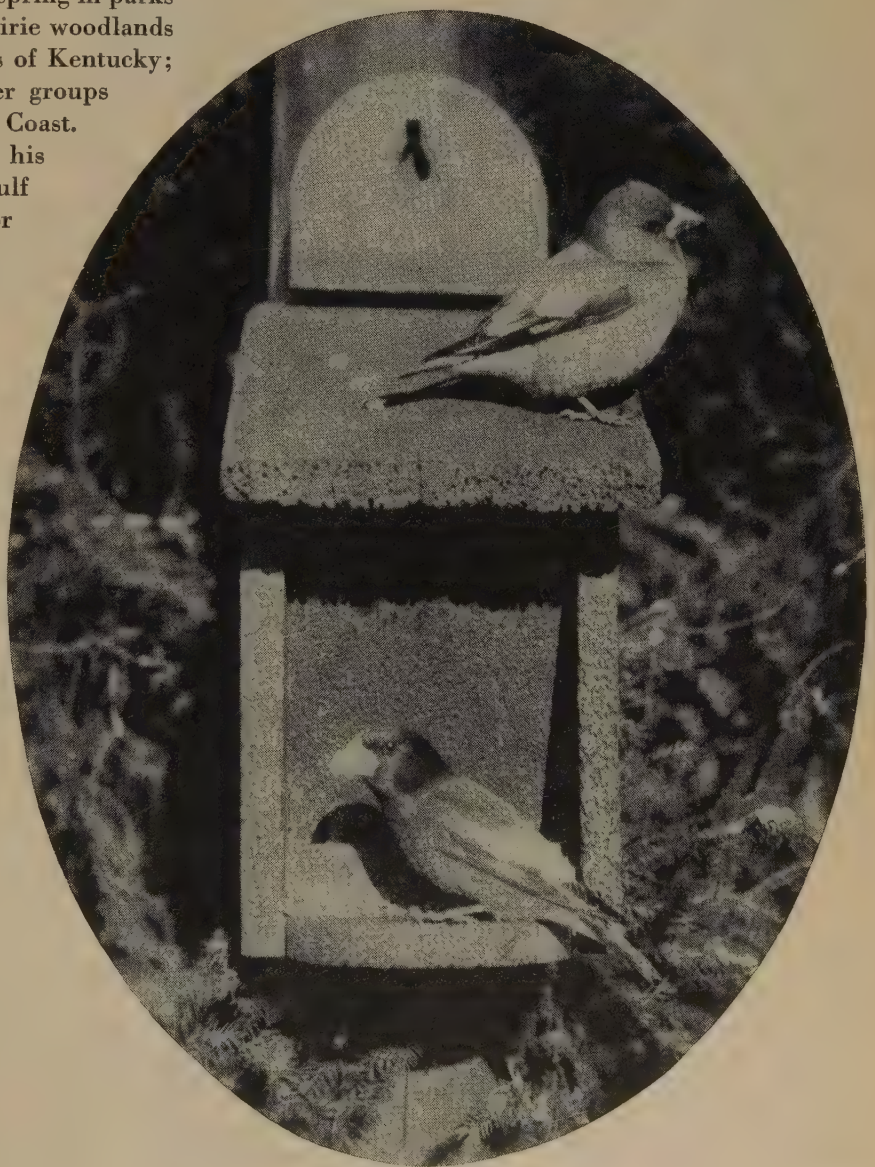
The birds wintering in southern Michigan stop off to feast on the berries of rose brambles and weed seeds along their route. Some linger into the spring in parks near Detroit, others wing on to the prairie woodlands of Illinois and the rolling countrysides of Kentucky; feeding, resting, scattering into smaller groups as they wander on down to the Gulf Coast.

Mr. Magee has had reports from his finches in practically every one of the Gulf States. If a banded bird is found shot, or dead from natural causes, the band is sent to Washington, D. C., for the record, providing information on the migration and distribution of the species, a bit more to add each time.

One of the three finches that were banded while I attended the simple ceremony that September afternoon was an adult female. Mr. Magee let me hold her in my hand! If you have ever felt the beat of a tiny breast dressed in the soft, brown-flecked feathers of a lady purple finch, you know the thrill of delight that was mine. She was a demure companion in comparison to the glorious male that had sung from the cherry tree, but she had a taking manner. At each side of her brown bonnet was a stripe or patch of off-white color. Her stout bill was yellowish, as was the inside of her mouth.

Mr. Magee pointed out that the inside color of the mouth was a method of determining whether this bird was a "she" or a young "he". It is almost impossible to distinguish the sex of young purple finches. The males do not attain their rightful

Evening grosbeaks enjoy the Magee hospitality on a well-stocked feeding tray. Their host foots the bill for more than five hundred pounds of sunflower seed every year. Below, two grosbeaks perch on one of the smaller sheltered feeding trays that have attracted so many of these birds and purple finches to the sanctuary of his garden.



glorious coloring until after the first year of life. That was about the age of the second bird in the trap that Mr. Magee tagged with a shining, numbered bracelet. "This finch," he stated, "is a year-old bird, going into his second year."

The young male would in time be a handsome fellow. But at this immature age his head and throat showed only traces of a faint rosy color, as though he were breaking out into a mild feathered rash of scarlatina. He was moulting, too!

"How can you tell?" I asked. He deftly spread a tiny wing and pointed to the primary feathers. They were of irregular length, as were the tail feathers, showing the plumage change in the bird.

Michael J. Magee, bird in hand, in his garden sanctuary. Traps in which the birds are caught for banding are on the ground.

Just then a bird of a distinctly different color flew past the window. It was a larger bird trimmed in dull gold. Then another, and yet another winged past the open door into the tempting garden of sunflower seeds.

"Who? What? Where?" I began, excitedly.

Mr. Magee laughed. "Evening grosbeaks," he said. "They're beginning to come in now, too."

Then I learned that not only is Michael Magee noted for his work with purple finches, but that he has a national reputation also for his banding records of evening grosbeaks. He has definitely established an east and west migration of the birds, which are as bizarrely feathered in yellow as the finches are in rose.

Four thousand, eight hundred and ninety-one evening grosbeaks have traveled to the garden at the Soo since 1923 to be banded by the eighty-year-old banker. One of that number made a round trip to Sandwich, Massachusetts, and back. About seventy-five grosbeaks that were banded by Magee have been picked up in the East at different places.

Mr. Magee is very economical with words, but he did explain that he is one who would rather know all that one can learn about one or two species than to have a smattering of knowledge about many. He told me that this evening grosbeak movement from west to east covers a stretch of about 1500 miles; from western Manitoba to northern Maine. The strip is about three hundred miles in width. And just about in the middle of this flight of sprightly grosbeak migration lies the peaceful and tempting sanctuary at Sault Sainte Marie, Michigan.

This successful sanctuary has made a name for Michael Magee, for his grosbeaks and purple finches, in returning year after year to the sunflower seed, mountain-ash trees, and fresh pools of water in the garden, have contributed valuable data on ornithological science.

One Madame Finch, for instance, made her first visit to the Magee banding-trap in 1935. She has faithfully returned each season for the past eight years. Two seasons she coquettishly appeared in apple-blossom time. But last year she turned up on a hot day in August all out of sorts, just to be registered in one of the Magee traps. Or so it might have seemed, for there is no accounting for an unpredictable female, no matter what the species. And a male purple finch added his bit to bird-lore when he established a longevity record by returning for ten consecutive years to the backyard fringing the historic iron ore locks of the Great Lakes.

And so they come and they go; in war as in peacetime. In the meantime, a smallish, unassuming man, like the one who grew roses in bombshelled England, spreads the blessed gospel of a divine sort of peace by continuing a cultural pursuit in a garden carved sharply from a seething, tumultuous war center. It seems an ephemeral quality of peace, to be sure, but it is one as enduring as the migration seasons of the yellow-trimmed grosbeaks and wine-colored finches that travel the air over the continent of North America.

★

DISCOVERY

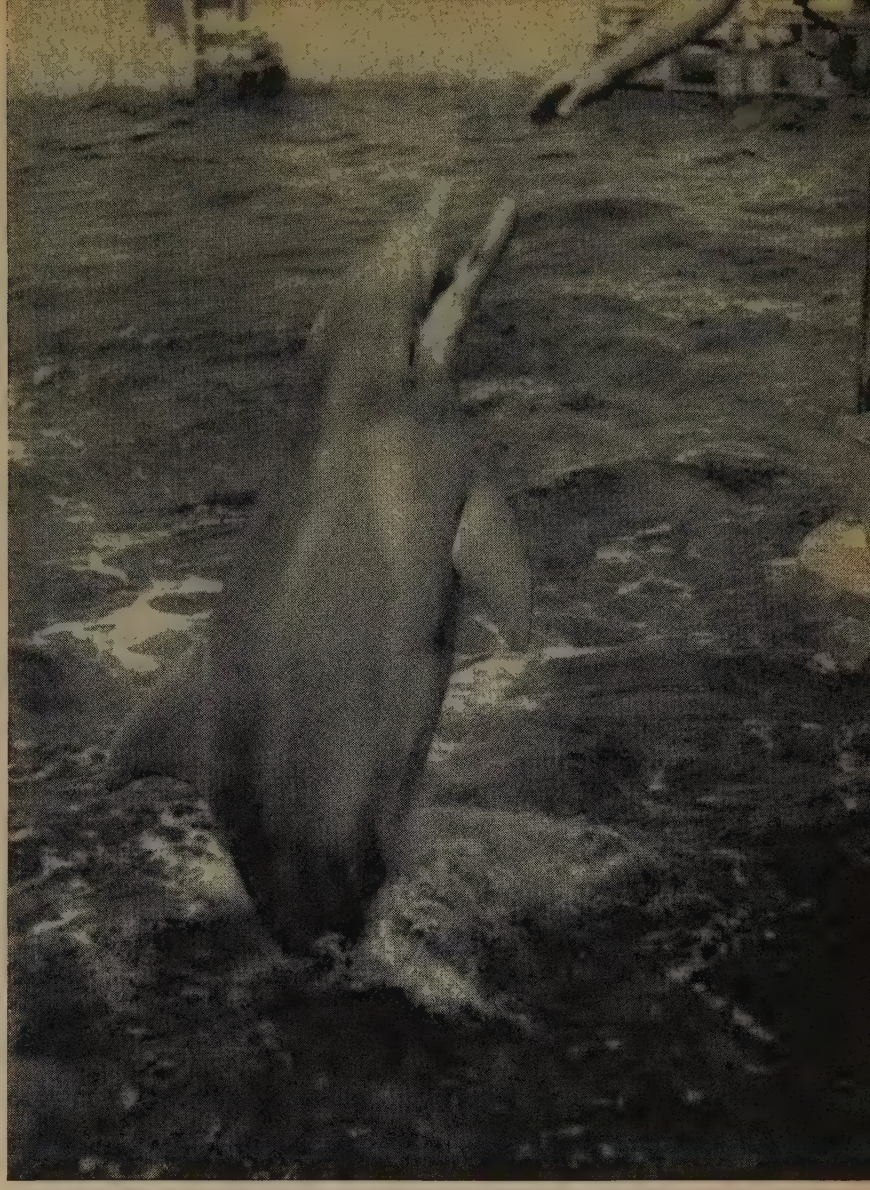
By PAUL CHURCHER

Denied. Rationed. Super-highways,
Do I miss you? No! At last your
Spell is ended. I've found by-ways
Worn by cattle through a pasture.

Fascinating and friendly, the porpoise is the—

Athlete of the Sea

By EDWARD B. TRACY



This photograph of a porpoise at Marine Studios, near St. Augustine, Florida, shows the animal's tremendous power. Weighing more than four hundred pounds, it supports itself vertically by rapid movement of its tail.

BOTTLE-NOSE dolphins, commonly known as porpoises, can swim at a speed that challenges the imagination, and can outjump anything that swims. Naturalists, fishermen and sailors the world over would agree that these friendly mammals are the greatest athletes in the sea. And, with the exception of sea lions, they are the most intelligent of all the inhabitants of the deep.

Many of our fighting men, traveling to far battlefronts, have watched the antics of these interesting animals. A recent account of the survivors of a torpedoed ship reports that a small school of porpoises played around their life raft for eleven days. When rescued, the men said that their company played an important part in keeping their minds off their predicament.

Whether you are a novice or an expert angler, there is little likelihood that you will ever catch a porpoise with a rod. Some of our greatest big game fishermen, past and present, have exhausted their resourcefulness, patience and skill trying to land one. As yet none have ever been taken by rod and reel, so far as I know.

Since the early days of sailing remarkable stories have been told of the high degree of intelligence of porpoises. Undoubtedly many of these are true. "Pelorus Jack" was probably the most talked-of porpoise that ever lived. For more than thirty years this famous creature accompanied vessels into the entrance of Pelorus Sound in New Zealand. Every sailor in that part of the world knew of him, and several years after he developed the habit of playing around the bows of passing ships, he was given protection for his natural life by an Order-in-Council. "Pelorus Jack" was last seen in 1912.

I know of two instances where porpoises played around survivors of wrecks as they drifted in lifebelts. And whenever sharks came near, the porpoises drove them off with lightning-like lunges.

A porpoise has never been known to attack a person. Many instances of these fascinating mammals rolling human bodies ashore have been reported. The most outstanding concerns the time of the historic Galveston flood, when great schools of porpoises rolled bodies in from the sea. This is unquestionably done in play as I have seen them roll a small log for several hundred feet, often leaping over it. Then, in a graceful swirl, they would rush back to continue their game of "rolling the log" by nudging it gently with their heads.

Several years ago a huge tiger shark came into Pensacola Bay. Fishermen saw it often as it circled their boats, and during the course of several months three bathers were killed by sharks. It was believed that this one was responsible for all three deaths. Less than a week after the disappearance of one of the victims, a small school of porpoises was seen splashing violently near a dark object close in shore. It was the body of the man, and with swift rushes they nosed it onto the

beach. If the water receded, leaving them high and dry, they flapped vigorously until they slid back into the water.

I once saw a mother porpoise outwit a mackerel shark that would have killed her young calf if it had not been for her tremendous speed and agility. She was floating almost motionless with the calf beside her. Suddenly a sinister shadow drifted noiselessly beneath them. In the crystal-clear depths I could see the killer's fins fanning the water. Its cold beady eyes never left the floating pair for an instant. Slowly it started to circle, then shot upward. Almost with the speed of thought the mother porpoise swerved, brushing the youngster aside. The shark flashed by, its wicked jaws closing with a click dangerously close to the little one. It lunged again, but at that instant the mother porpoise dived underneath the shark. As if a powerful spring had been released, she flipped her tail, sending the 200-pound killer almost completely out of water. Before the attacker had gotten its bearings, mother and youngster were headed out to sea at a speed that made them look like skipping stones.

One of the enemies of the porpoise is the killer whale, or grampus, which usually hunt in schools. Sharks, too, take their toll, and, in southern waters, the barracuda, the wolf of the sea, is a heavy destroyer of young ones. Last summer a very large killer whale, taken off the coast of Alaska, had four full grown porpoises in its stomach, swallowed just a short time before the marauder was harpooned.

Unlike fishes, porpoises propel themselves with an up-and-down motion of their tails. An extremely powerful body, smooth and wonderfully flexible, gives them an enormous leverage for the manipulation of the tail. This accounts for their amazing speed and jumping ability.

They are built for speed and one of Nature's most perfect examples of streamlining. When in motion they are gracefulness itself. Often, when swimming slowly, they will roll from side to side to the point of being upside down. In a particularly exuberant mood they will, with a sudden thrust of their long fins, make one or two revolutions without any slackening of speed. Then, with a seemingly effortless drive of the powerful tail, they will leap clear of the water for distances of more than twenty feet. Often they leap into the air and turn complete somersaults while close to a ship.

Recently, while fishing south of Long Key, we saw a huge porpoise at the mouth of a blind bay. It was one of the largest that I had ever seen. Lazily it coasted with dorsal fin out of water. We shut off our motors and drifted into the bay, our cameras clicking as the animal moved slowly ahead of us like a submarine. Reaching a point where the bay narrowed to a distance of thirty feet, we edged around broadside, blocking the porpoise's retreat.

For several minutes it nosed along the edge of the bay, rolling slowly, expelling its breath with a loud "woof". Suddenly there was a swirling turn, a powerful thrust, and the water splashed as if a charge of dynamite had exploded. There was the flash of a white belly as the porpoise sailed over our bow in a graceful leap. It had made a broad jump of more than twenty feet and cleared the boat by fully five feet.

One of my old fishing guides had an experience with a porpoise off the Florida Keys. He had been offered a good price for a live porpoise, and although he had never tried to catch one he did not anticipate any unusual difficulty. Locating one in a narrow bay, just south of where his small houseboat was moored, he and his three helpers towed an old, unused barge into the opening. They edged it around crossways, completely blocking the passage. Then they sat down to smoke and wait until the tide receded.

There was a large school of mullets in the bay and the porpoise trailed them cautiously, occasionally darting into their midst, scattering the silvery bodies fanwise. The porpoise gave no indication that it was alarmed until the tide started to recede. Then it whirled and faced them, its head moving from side to side. Backing away slowly, it became in an instant a grayish streak, a 400-pound living torpedo driving straight for them. When several feet from the edge of the barge it shot out of water. The men ducked and it went over their heads, showering them with mud and water. Landing with a terrific splash, it darted out into the channel, leaping completely out of water every fifty feet as it raced for the open sea.

Three years ago a small school of porpoises broad-jumped over the heads of several astonished scientists while they were studying their habits in one of the inlets south of St. Augustine.

Zane Grey's old fishing (Continued on page 388)

To An Oyster

By HUGH W. OLIVER

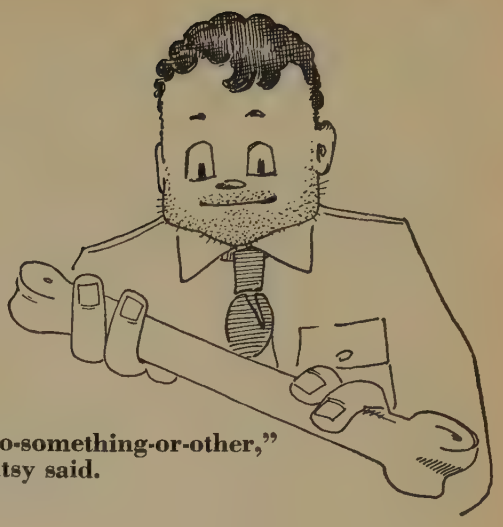
The oyster, though an humble creature,
Is yet a most accomplished teacher;
Who, while his life in bed is spent,
Contrives to live his life content.
By door hospitably wide
He sits inviting all inside;
And though his mouth is mostly open
To other's hurt he's never spoken.
In other words he bears no ill
To him whose mouth he lives to fill.
But this I think his greatest claim
To pedagogic name and fame:
When to his life misfortune comes,
Stones in his shoe or sandy crumbs,
Or anything he can't eject,
Does he forget his self-respect?
Ah, no! At once with oyster skill
He takes the moonlight, if you will,
The moonbeams filtered through the sea,
And fashions them exquisitely
Around that sandy irritation.
And lo, behold a new creation!
A gem to please some charming girl,
The moon in miniature—a pearl!

Stalagmites, salamanders and the floor of an ancient sea were all found in—

Patsy's Cave

By JUSTIN DENZEL

Illustrated by Lawrence D. Conway



"Maybe it's a dino-something-or-other," Patsy said.

This is another article by Sergeant Denzel, naturalist and tank corps specialist, in which our fighting men meet up with Nature.

WE PULLED into bivouac about two o'clock in the morning. The night was moonless and dark. The outline of a few cedars gave only a general idea of the terrain. Further exploration had to wait.

The next morning at chow Patsy came dashing toward me. From the expression on his face I knew he had found something new. It was the same look he wore when he brought me, tied up in his handkerchief, "a very screwy bug", which turned out to be a walking stick.

Patsy puffed to a stop in front of me. His curly black hair hung down from under his cap. His square jaw was covered with a three-day growth of stubble. He looked as though he had posed for the slogan—"tough, but, oh, so tender!"

Patsy had quit school in the sixth grade. In civilian life he had driven a truck—"one of them big jobs"—with a trailer attached. He had not frequented art museums or symphony concerts, and he may have thought a best seller was a new type of breakfast cereal. I do not know about that, but I do know he was the best tank driver in the regiment. And he had a lively and inquiring mind.

"Doc," he said, once he caught his breath, "I found a cave—a big one, not one of them measly ones like we saw before. This one goes way back. When I woke up, I turned over and most fell in it. Do ya wanna go in with me? I'll bet it's full of rattlesnakes—an' stuff."

"The going got a little tougher. We had to duck walls most of the time, and once or twice we had to crawl."

After our routine work was finished we rounded up a couple of lanterns and a length of stout rope, and started out to explore Patsy's cave. The entrance was spacious and led into a sort of vestibule, the sides of which were covered with a thick matting of lichens, bladderwort and moss. The floor was slippery with mud and cluttered with the bones of a large animal. Patsy picked up a leg bone and examined it closely and curiously.

"Maybe it's a dino-something-or-other," he said. "Seems like I saw one just like it in a museum once".

The remark carried me back to the day I had played hookey to lug two suitcases full of old bones twenty-five miles by train to the American Museum of Natural History. When I displayed my "find" the curator smiled in kindly sympathy. The bones belong to an old truck horse. I chuckled in memory of my chagrin.

"Wha'cha laughin' at?" asked Patsy.

"Sorry," I said, "but it's an old cow. There's the skull over there."

Patsy groaned and we started on. The going got a little tougher. We had to duck walls most of the time, and once or twice we had to crawl. Patsy was in the rear, and as we talked back and forth our voices seemed to echo a hundred times. This pleased Patsy and he amused himself yelling "K. P's outside," "yard bird", and some choicer items of Army slang. The passage began to widen, and all at once we came to a large cavern. The roof was thin at this point, and greenish rays of light filtered through cracks in the rock overhead. The place seemed like a little chapel, with stalactites for candles lining the walls. The floor was pitted with little pot-holes, some of them half-filled with water. I was poking in these hoping to find some kind of life when Patsy yelped, "Hey, Doc, this place is full of lizards!"

I jumped up and turned the light on the honeycombed wall. A half-dozen little heads popped back into the darkness. I started to search the walls around the entire cavern. Wherever my light fell, I saw the same little heads. When the light hit them they slunk back out of sight like little

jacks-in-a-box. We tried to catch one by swinging the light fast and then making a grab for one of the heads, but they were too fast for us. So I sent Patsy back for a length of soft copper wire and a jar. He returned with both in a few minutes, plus a stout cedar club. He was taking no chances.

We bent a small hook on the end of the wire and began to poke it into the holes, hoping either to chase out or hook one of the little creatures. A half hour's fishing brought no results. Then Patsy had a brilliant idea. Since the lizards did not like the light why not put the light into the holes? he asked. Then they would run outside because it would be darker there. Backing up his idea, Patsy reached into his pocket and produced a little pencil flashlight. We fastened this to the end of the wire, turned out the lanterns, and Patsy poked the little light into the hole until it was lost in the darkness. We waited tensely. Patsy counted softly to one hundred, while I stood ready with the jar and lantern. I heard him mumble, "ninety-eight, ninety-nine, one hundred—go!" I quickly turned on the light and there, clinging to the wall, were more than a dozen lizard-like creatures. I made a quick grab. Patsy dropped the wire and did likewise. We threw the wiggling captives into the jar and slammed the lid shut. We continued the stratagem until we had all that would fit in the jar without crowding, then we held

"Patsy raced to his tank."

them up to the light to get a better look. They pushed their grotesque heads against the glass and their eyes bulged like those of a frog. They were about six inches long, orange-red in color and pepper-spotted with black.

"What kind of lizards are they?" asked Patsy.

"They're not lizards," I said.

"Alligators, mebbe?"

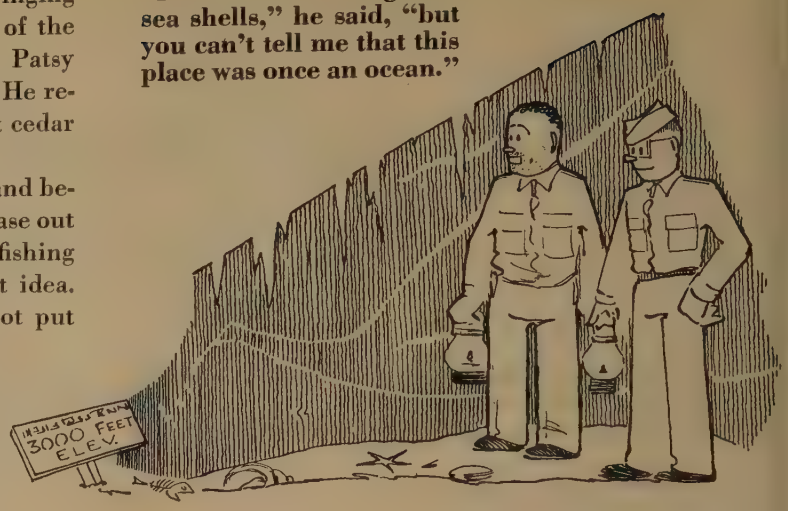
"No, salamanders," I replied, "sort of a cave salamander. Scientists call them *Eurycea maculicauda.*"

"Oh, oh," said Patsy, "there you go again."

"They're not blind like the true cave salamander and they don't always live in caves. They are what is known as trog-lobic forms, meaning they live in caves, if there's a cave handy. If not, they live above ground like any other self-respecting salamander."

"Well, it beats me," said Patsy.

"I know those things are sea shells," he said, "but you can't tell me that this place was once an ocean."



"What beats you?" I asked.

"Why anything would want to live in a place like this."

We left the jar of salamanders in the center of the cavern so we could easily find it on the way out, and pushed on farther into the cave. It was high enough for us to walk erect and wide enough for the two of us, except where some protruding ledge obstructed the passage. The floor became rather rough and proved to be composed of thousands of shells and corals.

"In case you don't know it, Patsy, you're standing on the bed of an ocean."

Patsy looked doubtful. "I know those things are sea shells," he said, "but you can't tell me that this place was once an ocean. We're in the middle of Tennessee, about five hundred miles from the nearest salt water. How come, then?"

"If you took your rifle a hundred miles out in the Atlantic and dropped it overboard, what would happen to it?" I asked.

"It would rust, and the top kick would get after me," answered Patsy.

"Yes," I said, "and what else."

"Oh, I suppose it would get covered with a little sand."

"You say a little sand because you're thinking in terms of days. Just think a little sand each day, three hundred and sixty-five days a year. The layer of sand over your rifle grows higher. Then think of a hundred years, a thousand years, millions of years. The layer of sand gets higher than the Empire State building. The pressure is terrific. The sand cements together and turns into stone. Now if some force pushed that sandstone up out of the water what would you have?"

"An island, I guess."

"That's right, an island. It's now dry land, just like Tennessee. And now if somehow or other a cave were formed right on the same level with the ocean bed where your rifle lies, where would you most likely find your rifle?"

(Continued on page 388)

There is wide variety of Nature motifs in the old metal buttons that provide the collector with a field of unlimited possibilities. Here are only a few of this type, some of which may be in the home button box.

Collectors find a hobby that provides beauty and interest through amassing—

Nature Buttons

By THELMA SHULL

HOBBIES always boom in times of stress. They offer relaxation, and, in these gasless days, an activity for the enforced stay-at-home. When one thinks of collecting, the first thought is of those who pore over stamps and stamp catalogs, or amass coins, or scour the countryside for bits of ancient glassware. But among the army of collectors are the button enthusiasts, who are just as avid for rare specimens as any philatelist. Among them are specialists, too, for the designs of and on buttons are almost as varied as with stamps.

Buckles, brooches, pins and tie-strings were the early forerunners of the button, which seems to have come into its earliest general use in the 1500's. Brass buttons appeared on dresses of that time, but it was not until the Eighteenth Century that real variety of material and design became the vogue. Then buttons of gilt and papier-mâché were devised, and makers began to seek other materials such as vegetable ivory from the corozo nut, a palm fruit that could be worked and dyed. Real ivory, hoof and horn, bone, mother of pearl, glass and wood were used, and designs were cut or pressed into the material in such variety as early to create a collector's paradise. And the myriad plastic buttons of today provide a climax in button history.

Birds and mammals, trees and flowers, insects, and other Nature subjects early provided inspiration for the button designer. Nature gave so many ideas, indeed, that the button collector can specialize in Nature buttons alone and never exhaust their possibilities. He may even concentrate on dog buttons, for example, and soon face the problem of where to keep them all. Let him gather some old buttons with bulldogs, setters, spaniels, hounds and St. Bernard's and he is lost, for—old and new—he can build up a button kennel of rare beauty and interest.

Vogues in button designs appear to have changed from time to time. There were a number of years during the Nineteenth Century when designers drew on Nature almost exclusively for their ideas. The deer was a favorite subject, with fox, wolf, elephant, buffalo, opossum, wild boar, giraffe, lion, camel and tiger enjoying much popularity. Nor were snakes, crocodiles, frogs and squirrels ignored. Such designs, many of which were sufficiently good to permit identification of the species, open doors for Nature study.

The modern development of the plastic button has added much color and even more variety. Plastic buttons available across the counter a year ago are no longer sold. New "issues", as the stamp collector would

Modern plastic buttons have also drawn on Nature and are varied and colorful. There is a parrot of conventional green; a bluejay in natural color; a penguin in his garb of black and white; a deer of translucent red plastic. The spider and its web are outlined in pink against a light blue background. Other Nature buttons suggest the wide variety of the button of today.

call them, have taken their place, widening the collector's field.

Sporting buttons, often found in sterling silver, are a specialized subject for the discriminating collector. Many of these silver buttons are stamped with English hallmarks. Their craftsmanship is often lovely, for they were designed by real artists. The firm of Allan and Moore, English manufacturers, met the demand for variety in this type of button by making more than three thousand dies between 1849 and 1852.

This quantity production explains why beautiful old buttons are still available in goodly numbers today. Some patterns were kept only a few weeks and then the dies were destroyed. The company received orders for specially-designed buttons for clubs, private and public livery stables, for this or that hunt, and other sporting purposes. It took two or three days to make some of the dies, and an entire month for others, depending upon the detail involved. Button dies were considered among the highest objects of the die-sinkers and medallists' art. Engravers worked out the design little by little, and often made impressions of it on red clay to see how the design was progressing.

Sporting buttons are particularly beautiful and the detail on them is exquisite. A hound clearing a hedge, a covey of partridges, a listening stag, or a bounding fawn, are examples of the pictures to be found. An inquisitive little rabbit looks over a stone wall; sheep rest contentedly under a spreading tree; a rooster pecks at a bunch of grapes; Chicken Little stands with wings uplifted and illustrates the leading character in the story of that title, and a dog jumps at flying birds even though held in check by a leash. Other friendly creatures encountered on farms and on old buttons are horses, cats, cows, pigs, goats, ducks, geese, and turkeys. Still other live creatures from the world of Nature depicted on buttons are mice, rats, crabs, grasshoppers, beetles—even mosquitoes.

Birds that may be easily identified from their miniature likenesses in metal are the swallows, woodpeckers, parrots, storks, quails, owls, peacocks, cranes, pheasants, swans, herons, eagles, and cockatoos. Peacocks are pictured with their sweeping plumage, smaller birds are on the wing, ducks and geese swim in shallow ponds with cat-tails and grasses surrounding them, birds feed their young, and countless other pictures of birds are pressed on old buttons. There are other winged creatures that will fly right into the collection if one wants them—butterflies, bats, flying fishes, bees, and flies.

Botanists naturally tend to collect flowers, grasses, trees, and leaves pictured on buttons. These have been made in bewildering numbers. There seems to be no limit to their variety. The same subject may often be found presented in several different designs and in more than one material, thereby comparing somewhat to the different mint marks on coins. However, the button collector has no known limit to the types and subjects he finds, for thousands and thousands of different dies for buttons have been made in the years since these small but useful objects were first used as fastenings for clothing.

There are many men and women in America today whose hobby is collecting buttons, and those who are specializing in pictorial representations of Nature on buttons have collections that will prove more entertaining and become more valuable as time goes on.

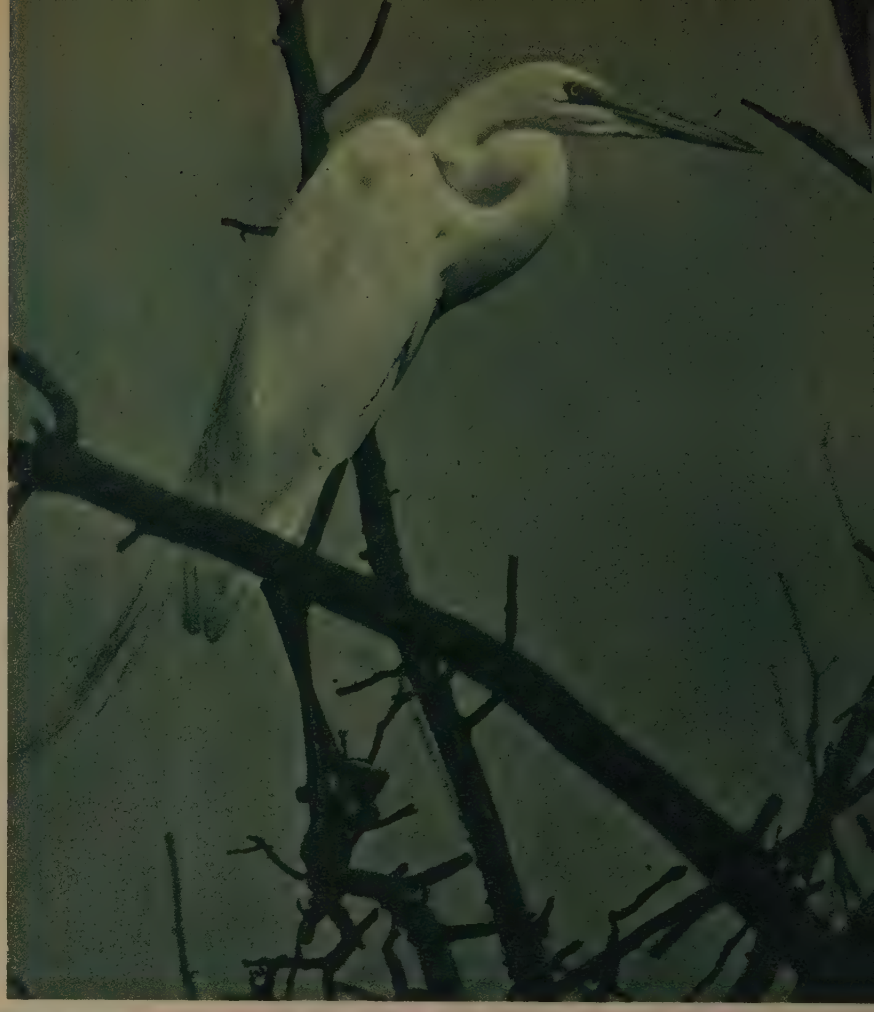
Two studies of Armenia, English setter, made by Frank Clodfelter, his owner. In the picture below, Armenia is shown with Prince, a white Persian. These animals grew up together, and ate and even slept together, except in hot weather, when they gave each other a wide berth. Only now and then was there a growl.

Egrets

By LEE JENKINS

Between eight hundred and a thousand black-crowned night herons, great blue herons and American egrets nest together in a rookery near Clarksville, Missouri. All three species frequently nest in the same tree, with nests close together. One large tree had twenty-eight nests in it, two hundred of the nests those of the egrets. Egrets have been nesting there for three summers.

On the opposite page at the top are the queer-looking egret young, about a week old. In the lower picture the trio, at three weeks, begin to give promise of beauty to come. Below, on this page, is a young egret that had fallen from the tree to the water below and managed to get out on a fallen log. At the right is an adult bird taken with a telephoto lens from an adjoining tree.

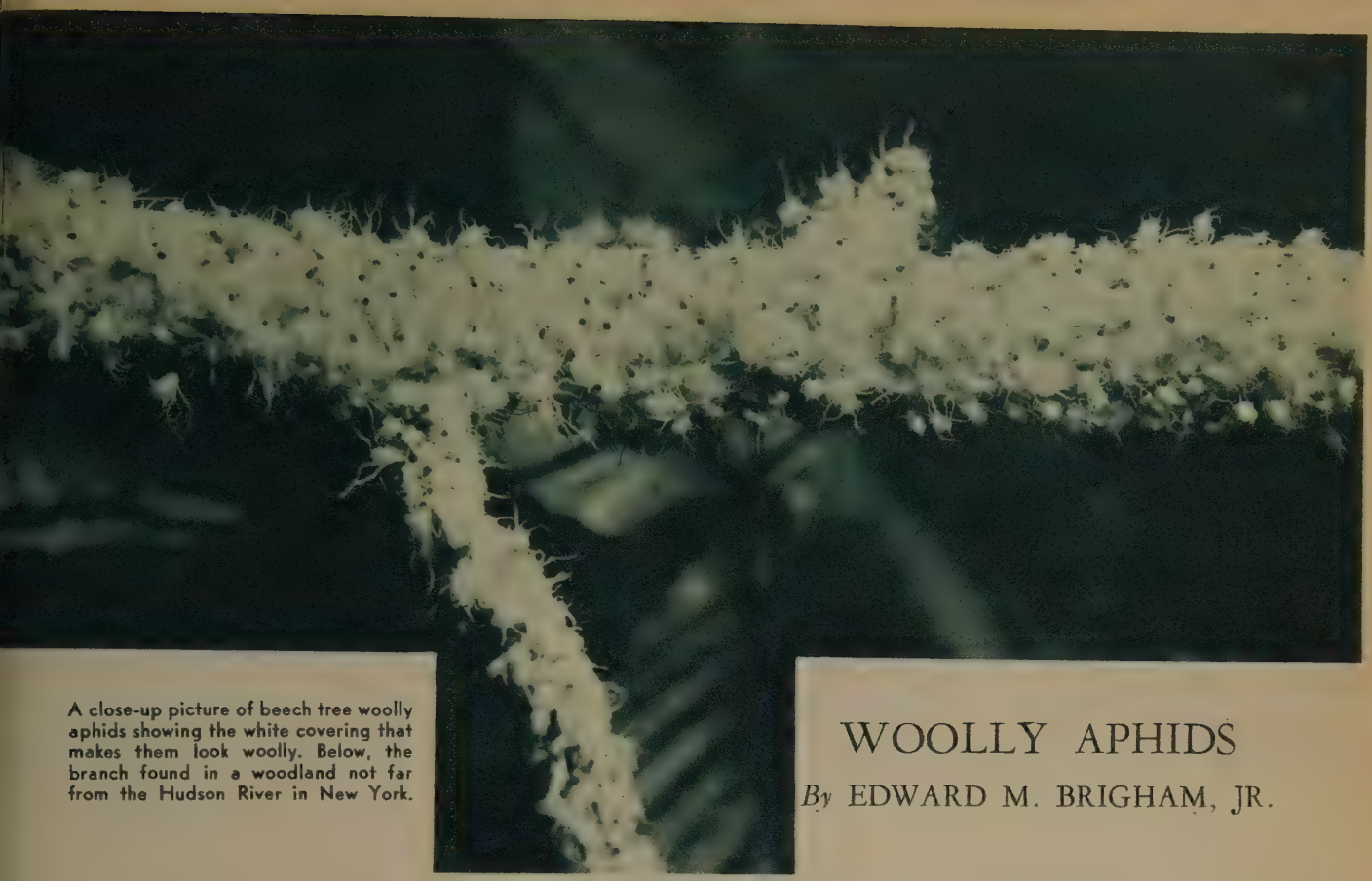


In this picture of a prairie dog reception committee, the photographer, J. W. Jackson of Brush, Colorado, has caught an interesting collective pose of these little animals of the open grass country. The second one from the right seems to be whispering to the middle one some juicy bit of gossip about the approaching visitor, and there is certainly an air of expectancy about all five of the young family.

Known to science by the name of *Cynomys ludovicianus*, these gregarious rodents are found only on the plains of North America. They set up their colonies in grassy country, and a prairie dog town is a scene of great activity as they scamper around or sit on their haunches chattering. A prairie dog burrow may serve as home for a dozen individuals, usually a family. The tunnels have been found to extend as much as fourteen feet straight down into the ground and then to branch off horizontally for as many more feet. The burrows are provided with grassy nests for the winter's hibernation, which may last for four months. The entrance to their homes is closed tightly before the owners retire for their long nap.

Prairie dog burrows often serve as nesting places, when deserted, for burrowing owls. Rattlesnakes, which often invade a colony in search of food, also take shelter in them. A colony in favorable surroundings may extend for miles by the spreading out of the surplus population to find housekeeping space.

These little residents of the prairie country prosper in captivity and colonies have been established in a number of zoological parks. They get along well together, feeding on grasses, bread, corn and other vegetarian items. The prairie dog life span is usually about four years.



A close-up picture of beech tree woolly aphids showing the white covering that makes them look woolly. Below, the branch found in a woodland not far from the Hudson River in New York.

WOOLLY APHIDS

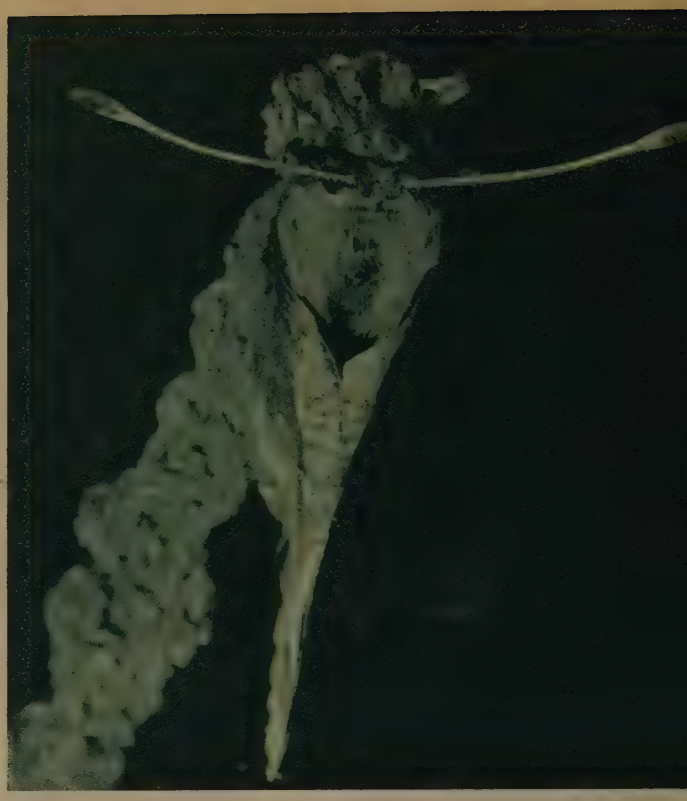
By EDWARD M. BRIGHAM, JR.

"Look at the funny white stuff on that branch," cried six-year-old Julia, pointing to a beech tree limb. We looked, and as the current of air swayed the limb the "white stuff" began to move in undulating waves, stopping when the branch became quiet. Looking closely, we saw that the white covering of the branch was made up of thousands of tiny insects, their bodies covered by a woolly coat from which protruded white threads from a quarter to half an inch long. It was a colony of those interesting plant lice, the beech tree woolly aphid, *Prociphilus imbricator*.

The several families of plant lice, or aphids, include many species, feeding on a variety of plants. Most of the aphids discharge a sweet liquid known as "honey-dew," and many ants, wasps and bees feed on this. Some species of ants maintain and care for colonies of aphids, "milking" the "honey-dew" from the insects by stroking them with their antennæ.

Although many aphids are protectively colored and difficult to see, these woolly aphids are conspicuous. Their whiteness, which is due to a waxy excretion, stands out, and they so infest the twigs and leaves of the beech that they are sometimes called "beech-tree blight." Although these insects have been known for a long time, their complete life history has not yet been worked out by scientists.

The undulation of the aphid columns on the swaying branch was most interesting. It was as though some masterful unseen force was guiding these myriads of insects in a concerted action. But for what purpose: a warning, or protective mimicry? And what defense mechanism can these tiny creatures have, or what could they be mimicking? We might speculate at length on reasons, and finally end, as one so often must, by admitting that this is another of those inexplicable mysteries of Nature that we are privileged to observe but never completely to understand.

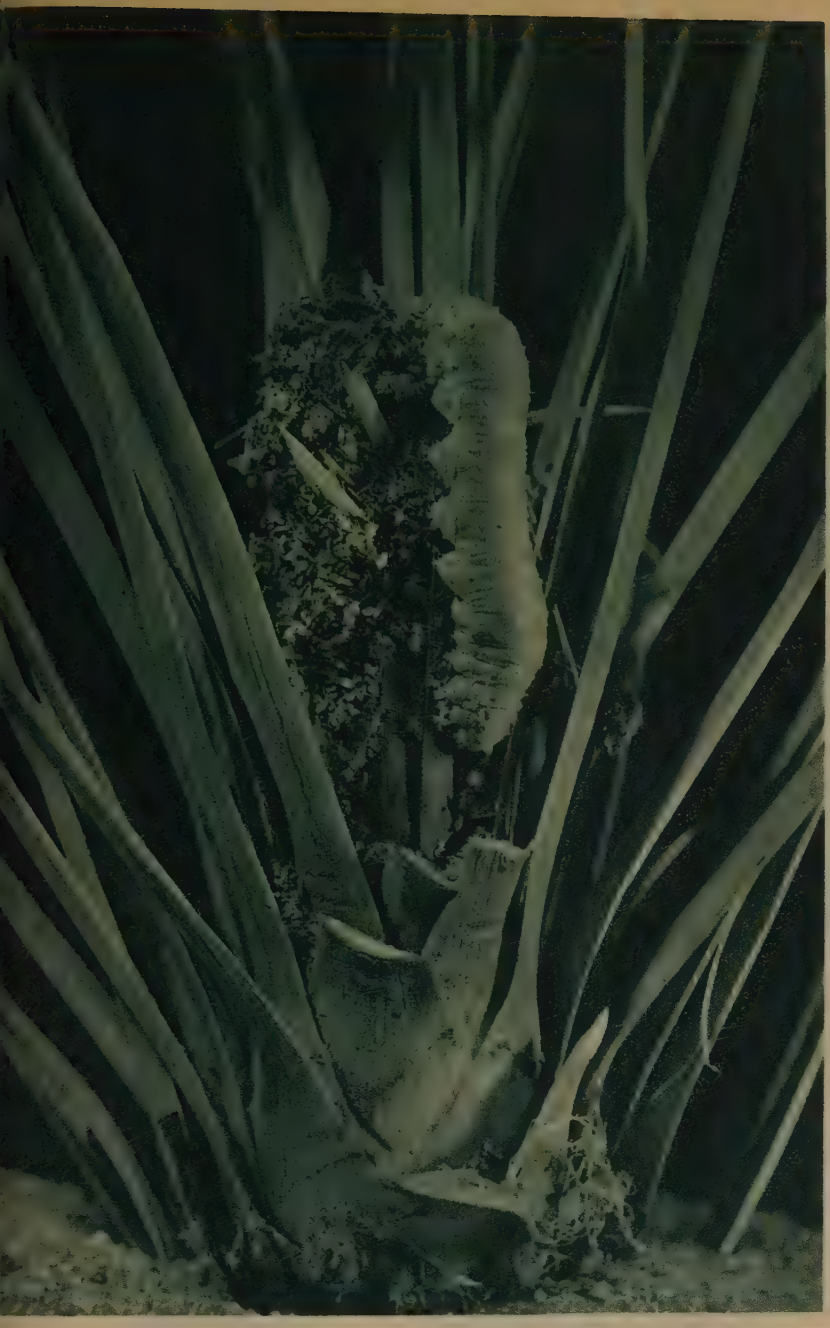


Upon the return of summer conditions the chrysalis opens and the adult skipper works its way up through the tunnel and bursts out into the sunlight. Here it climbs upon the leaf of the plant, or, as with the one pictured at the left, to a lichen-covered twig of an overhanging shrub. It expands its wings for flying. It is impossible to present the yucca skipper in a single view for in this picture we get an entirely false idea of the true character of the antennæ. So, in the picture at the right, we look down on the butterfly and see that the antennæ are long and curved, reminding one of the horns of a Texas longhorn. It is from the form of the antennæ that the lepidopterist makes his identification.

In January or February, ten months after the egg is deposited, the larva sheds its white skin for the last time and becomes a hard brown pupa. Another month passes, and from the spindle-like case a velvet-black butterfly emerges. It crawls through the burrow to the outer chamber, breaks through the debris and enters the sunlight. Here on the end of a dead yucca spike it fans its gold-barred wings until they are broad and strong. Then the Navajo skipper takes to the air, and, in its homeland, is relatively safe from the collector's net.

Not all the larvæ and pupæ that the naturalist finds develop into butterflies. A large percentage of them are apt to be parasitized by a tachinid fly which somehow manages to get its eggs into the body of the grub. But those adults that do materialize in the custody of the butterfly hunter are treasured and displayed with great satisfaction, and to the accompaniment of much reminiscence.

The view at the left is one rarely seen in Nature. The yucca skipper is a speedy flier, and as wild as the proverbial deer. In order to show this view the photographer had to descend to using a dead specimen for it would have been impossible to photograph one of the living insects.



The eggs of the yucca skipper produce a smooth-skinned larva that eats its way down into the stem of the plant. The larva spins as it eats, and the refuse from its eating is pushed out from the opening in the stem top. Here the material is held together by the webbing, and the cone of eliminated material is a clue to the hunter. The entire summer and fall is passed by the larva in this concealed retreat as it eats its way slowly toward maturity.

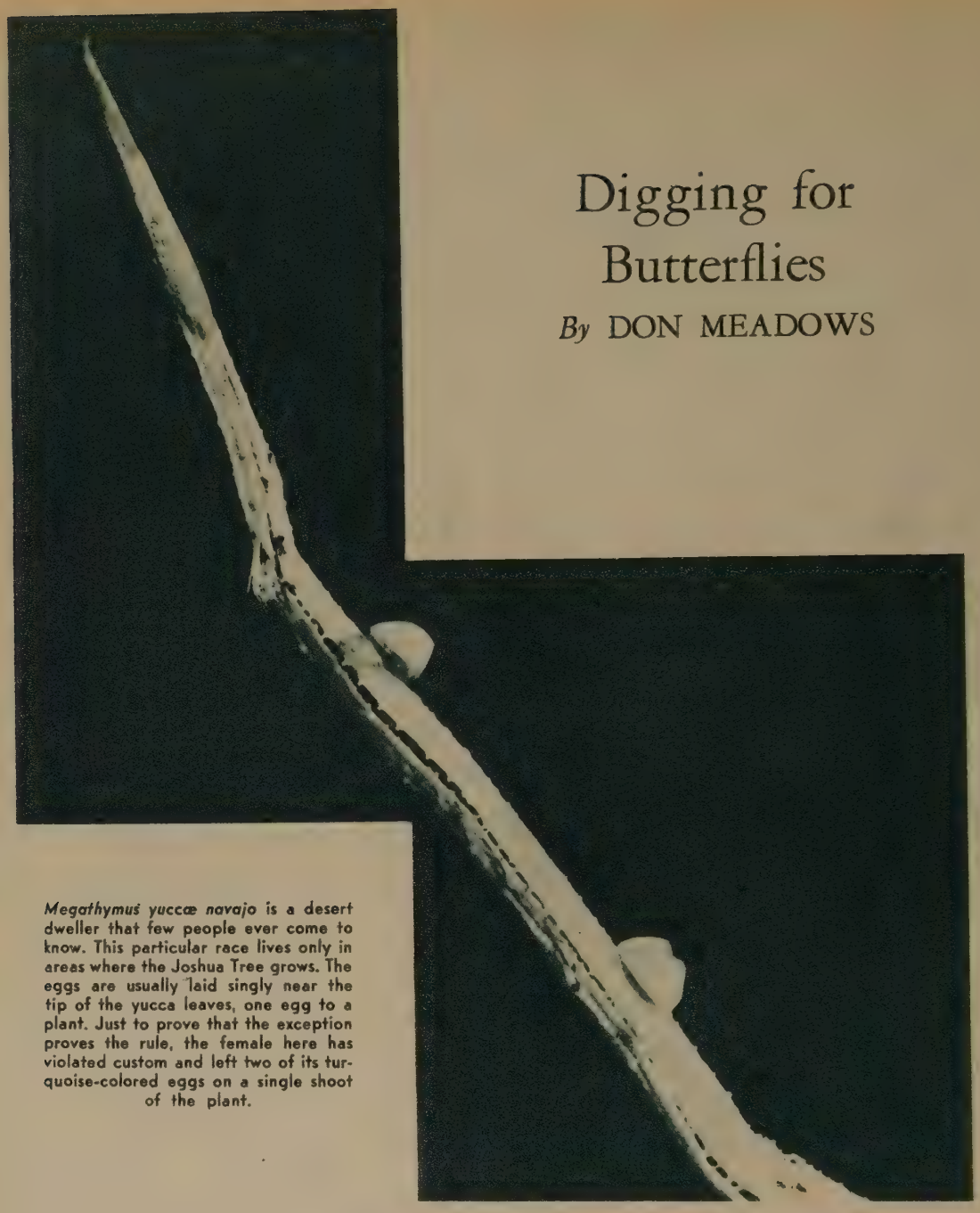
During the winter the larva water-proofs the burrow with flakes of white, wax-like material. In the early spring it slowly transforms to a brown chrysalis. In the picture below the host yucca has been cut open to show the tunnel lined with silken webbing, with the chrysalis snugly wedged into the lower end of the opening.

open so that the burrow can be kept scrupulously clean. As the root is eaten and digested the white grub backs to its doorway, and deposits the waste material among the dead leaves. Soon a large elongate deposit of tiny pellets is formed in the center of the dry rosette. This is the tell-tale sign the butterfly collector looks for. Then the lepidopterist digs up the evidence with his shovel along with a bit of root and carries it back to the museum. The butterfly emerges in captivity.

Collecting must be done after the middle of September for until that time the larva is feeding and extending its underground home. As winter approaches the grub seals up the chamber, water-proofs the inside of the burrow with a flaky white substance, and hibernates, safe from the rain and cold.

Digging for Butterflies

By DON MEADOWS



Megathymus yuccæ navajo is a desert dweller that few people ever come to know. This particular race lives only in areas where the Joshua Tree grows. The eggs are usually laid singly near the tip of the yucca leaves, one egg to a plant. Just to prove that the exception proves the rule, the female here has violated custom and left two of its turquoise-colored eggs on a single shoot of the plant.

Collecting butterflies with a shovel is unorthodox but effective when the quest is the Navajo skipper, *Megathymus yuccæ navajo*, once listed among America's rarest butterflies. The detective work of Commander Charles Dammers of Riverside, California, furnished the clue that placed many examples in the museums of the world.

Yucca skippers are widely distributed over the southwest and northern Mexico, but the distinctive race *navajo* is restricted to the desert Joshua Tree areas of southern California. It has a wing spread of two inches and is a rapid flier. Sometime in March or April this black and gold butterfly is seen streaking along the sandy washes in the Mojave Desert. With an abrupt stop it will come to rest on the ground, but at the least sign of danger it springs into the air and speeds away again. Specimens captured are usually worn and faded.

After the winter rains have drenched the desert sands small rosettes of sword-like leaves push up from the shallow roots of the Joshua Trees. Sometimes they appear many feet away from the shaggy trunk of the parent plant. In 1932 Commander Dammers saw a female Navajo skipper rest on one of these tender shoots and pause long enough to dip the abdomen in the familiar act of depositing an egg. The clue that solved the life story of *Megathymus navajo* had been found. With a magnifying glass, patience, and a shovel, the undercover life of the butterfly was disclosed. A year of investigation was necessary to unravel the events that led from egg to imago.

The Navajo skipper deposits a single turquoise egg at the tip of one of the pointed leaves of the yucca shoot. Eighteen days later a tiny caterpillar emerges and crawls down to the heart of the rosette of leaves. Here it chews a hole in the base of the rosette and enters the root. The shoot must be young and tender for an old one would be too tough for the weak jaws of the larva. Only one caterpillar develops in a shoot since there is enough food material in each root for only a single individual.

As the larva consumes the central core of the root the leaf spikes above the ground wither and turn brown. The little hole where the larva entered is enlarged and kept

As We See It

On the Altar of the Machine

"If we destroy all that is beautiful to create bigger and better machines, will those machines ever be able to repay what is lost?"

This question is asked by one of our readers, and it is one that is foremost in the minds of conservationists. It arises immediately from a proposal that threatens the scenic beauty and recreational value of Flathead Lake, Montana, and also affects Pend Oreille Lake, Idaho.

Excluding the Great Lakes, Flathead Lake is one of the six largest lakes in the United States. Of this sextet it is probably the most beautiful scenically. Flanked on the east by the Mission Mountains and the west by foothills clad in yellow pine and larch forest, this forty-mile-long, twenty-mile-wide lake has a gorgeous setting. Its fame is international.

In 1938 a dam across the Flathead River, four miles below its outlet from the lake, was completed. It was so built that gates could be put in, and a superstructure erected upon it, to raise the water of Flathead Lake as much as thirty-seven feet above its normal high-water level. However, in accord with the usual method of avoiding public opposition until it is too late, local people were assured that there would be no tampering with the lake level. Now comes a plan to make changes that will permit raising the level from three to thirty-seven feet as desired. To this is added the project of dredging the outlet so that the surface may be lowered as much as ten feet below low water.

All this means that at its highest stage one hundred square miles of the Flathead Valley, north of the lake, would be flooded; at low water more than one hundred square miles of mud flats and dead trees would surround the lake. Easterners may imagine what treatment like this would mean to Lake Champlain—which is not dissimilar in shape and setting—and what its ultimate fate would be.

The purpose of this proposal is to insure a steady flow of water over Grand Coulee Dam in northeastern Washington. Flathead Lake drains into the Clark Fork of the Columbia River, which fork passes through Pend Oreille Lake and on to Grand Coulee. Pend Oreille Lake, smaller but of much beauty and recreational value, would be affected as disastrously as would Flathead. One community, at least, would be submerged and noxious mud flats and eyesores created.

It should be noted that while the Grand Coulee program was being carried to a conclusion great care was taken to keep this present plan under the hat. It would never have done to let the public in on what the project meant in its entirety. The whole history of our great federal works projects has resembled the story of the young woman whose uncle gave her a new dress. At first she insisted that the dress was all she needed or wanted, but when she tried on the dress she found she "needed" a hat to go with it, needed shoes to match the hat, needed a new car to save the shoes, and on and on. Grand Coulee was just such a dress bought by Uncle Sam, and the hat, shoes and car are now being demanded in the form of auxiliary dams. If this tendency on the part of our planners is not controlled, our Uncle Sam will soon have to sell bit by bit all the wilderness and beauty, which was his birthright, in exchange for a mess of pottage.

This threat to these sections of Montana and Idaho is, of course, serious locally and important nationally. But it is of even more vital significance as a part of a developmental—or exploitational—philosophy with which we must soon reckon. The blueprints are already drawn for a post-war Roman holiday for the planners, reclaimers and developers. Highways hither and yon, with little or no regard for preservation of any such thing as wilderness—or even natural values—are mapped out. Dams galore are to be reared to supply water and power for agricultural lands and for electrification.

All this, of course, is designed to absorb the economic shock of demobilization of millions of men from the armed services and the transfer of millions of workers from the destructive enterprise of war. It all looks very well on paper and sounds lovely in theory, but it will be terrifically destructive to many of the tangible and intangible values that American men are fighting and dying for in the far corners of the world.

Specifically such threats as that to Flathead Lake, and generally other plans that are being dreamed up by such agencies as the late National Resources Planning Board, are part of a philosophy of supposedly paternalistic dictatorship that we may well find on our doorsteps when the wolves of war are driven away by men who, while driving them away, have had to leave their doorsteps unguarded. The public's wishes are of relatively little concern to those who cherish the Jovian notion that they know what is best for the people, as well as all the answers to what best serves the public welfare. What price the extermination of Hitler, if we are to acquire a lot of little Hitlers pontificating from a multiplicity of Government swivel chairs to tell us what we want and what we do not want? What price—in terms of the beauty of Nature—are we willing to pay for the doubtful privilege of being made slaves to the worship of bigger and better dynamos and a million gadgets?

Nature in Print

By HOWARD ZAHNISER

WILD animals, for some reason or other, have never seemed to arouse the popular interest that their close affinity to man would seem to encourage. The birds appear to have stolen the wildlife show. Robert Bridges, Britain's poet-laureate, in *The Testament of Beauty* even deprives the mammals of their close relationship, and puts into beautiful words what many others might declare:

> Birds are of all animals the nearest to men
> for that they take delight in both music and dance,
> and gracefully schooling leisure to enliven life
> wer the earlier artists.

It may be that Robert Bridges in thus resorting to esthetics has made the true explanation of the outstanding interest that birds command, but there may also be less romantic explanations. Birds, for example, are all about us in our waking hours, and by using the air as the element of their travel they have become almost inescapably conspicuous. Mammals, on the other hand, frequent the hidden places, and many of them move about freely only after it is too dark for human eyes to see them clearly. A result of this interest and lack of interest, but also another explanation for it, has probably been the comparative neglect of mammals by writers and artists.

If this is true it will be interesting to watch, for example, the results of the influence of such an artist as Walter A. Weber, whose drawings in the recently published *Meeting the Mammals*, by Victor H. Cahalane, are remarkably stimulating—not only illustrative but touched with the life that art can give to its subject when an inspired artist uses an appropriate medium. The grotesque awe of the moose, the placid majesty of the bighorn, and the fierce gracefulness of the otter are as vividly created in Weber's drawings as are the "cute" alertness of the woodrat and the stodgy self-assurance of the porcupine. Once those with an interest in the outdoors have been stimulated with some frequency by such drawings there may be a much increased interest in mammals, and particularly so if such influences are felt by beginners.

Meeting the Mammals is an apt title for a book designed, as Mr. Cahalane says, to be "a complete guide to our western park mammals and an introduction to the animal life of the western United States" and written with the understanding of human interest that has made the naturalists of the National Park Service so influential in guiding their visitors into an acquaintance with the mammals. "Meet the tough guy of the western mountains," writes Mr. Cahalane in introducing the wolverine, and on the opposite page

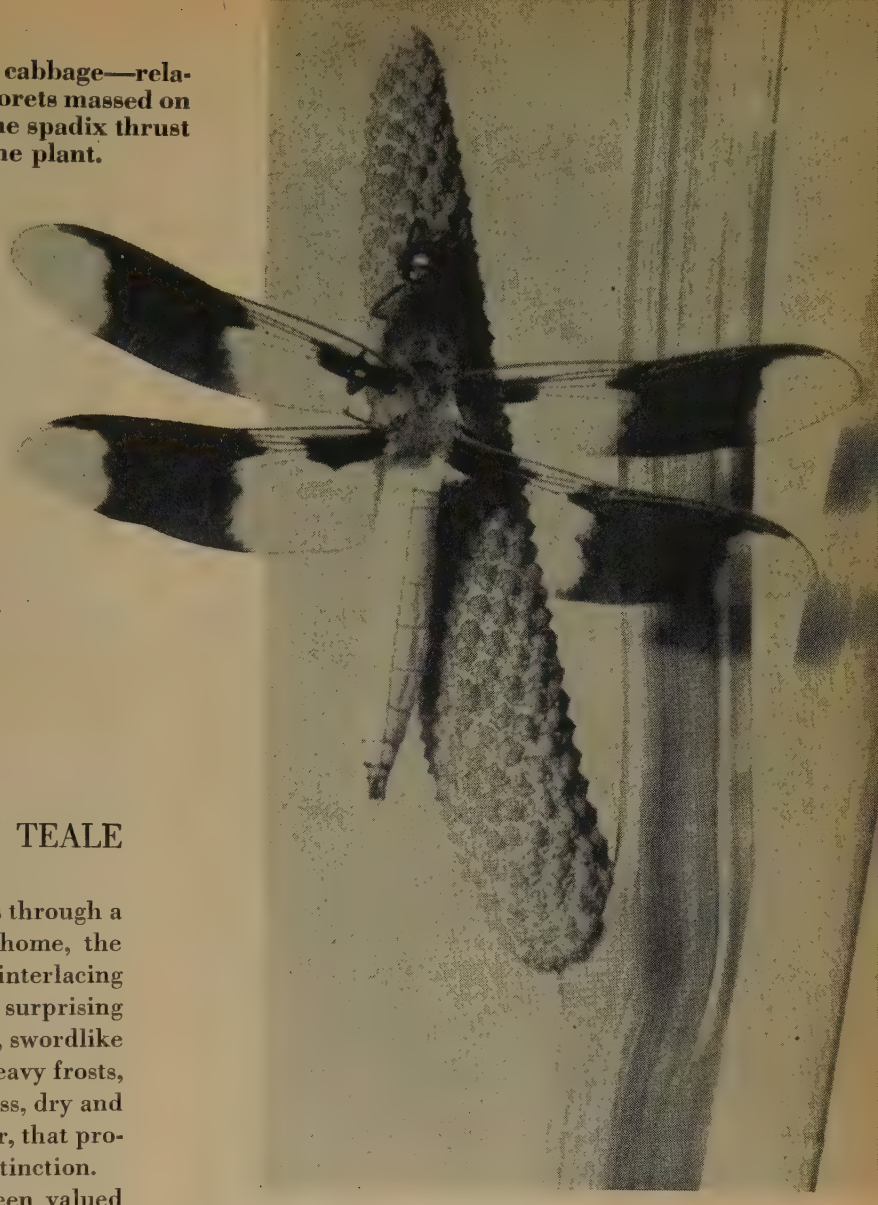
Porcupine, by Walter A. Weber, one of 67 illustrations in *Meeting the Mammals*, by Victor H. Cahalane

occurs a paragraph about the mink that has a familiar tone to any park visitor:

"At the head of Red Eagle Lake in Glacier National Park, a trail crew once noticed that a mink frequently inspected an egg crate in the cook tent. The busy men paid little attention until, one morning, squeals of rage and a great tugging at the lower edge of the canvas caused an investigation. The mink was furiously trying to pull a slab of bacon out of the tent. The space between the ground and the canvas was too small, and was that mink mad! He was still madder when the men took the bacon away from him. He had already made away with 2 dozen eggs, but what are eggs without bacon?"

Enriching his general discussions of more than five dozen mammals with such incidents whenever they were available, and adding concise paragraphs on "general description," "distinguishing characteristics," and where the animals are found, Mr. Cahalane has written a text that well merits the drawings by Mr. Weber. And together they constitute an excellent volume that has also been attractively handled by the publishers.

So effective have been such educational efforts by the National Park Service in the past (and Mr. Cahalane and Mr. Weber have both worked on this volume as naturalists with Park Service experience) and so slight has been the usual attention paid to mammals that undoubtedly many Easterners have returned from their western excursions with the impression that staying at home means missing the mammals. They should be agreeably disillusioned by W. J. Hamilton's most recent volume on *The Mam-* (Continued on page 387)



Like the jack-in-the-pulpit and the skunk cabbage—relatives of the sweet flag—the calamus has florets massed on a spadix. Here a dragonfly is resting on the spadix thrust out from the leaf-like spathe of the plant.

Sweet flag, rich in history and valued the world around, was

Cherished by the Pioneers

By EDWIN WAY TEALE

WHERE a sluggish brown stream winds through a bit of lowland, not far from my home, the banks are matted with the knobby, interlacing roots of the sweet flag. Each spring, with surprising rapidity, they send up thousands of slender, swordlike leaves. Each autumn, even before the first heavy frosts, these fast-growing leaves lie in a tangled mass, dry and yellow. It is the matted roots below, however, that provide the sweet flag with its chief claim to distinction.

Because of these roots, the plant has been valued around the world—in Asia, in Europe, including the British Isles, and in North America. In this continent it seems to have been especially valued by the various tribes of the upper Mississippi and the lower Missouri, by whom, apparently, it was rather widely transplanted from places where it was indigenous. It seems probable, also, that the pioneer successors to the native tribes helped to spread its original range, and in some cases its roots may have been brought across the Atlantic from Europe.

Scientists call this pungent member of the arum family *Acorus calamus*, following Linnaeus. Indians of the Cree tribe in southern Canada referred to it as "Wachusk mitsuin"—the food that the muskrats eat, and the same fact was noted by the Dakotas, and is reflected in their name for the plant. In Europe and America it has been given such varied names as myrtle grass, myrtle sedge, gladdon, cinnamon sedge, sweet sedge, sweet rush, sweet cane, sweet root, sweet myrtle and myrtle flag. The various references to sweetness in the common names for the plant arise from the fact that the stalks and root have a sweetish taste. To me, the flavor of the leaf-tips always suggests rhubarb.

In former years, the roots of this plant were far more highly valued than at present. They played a part in the treatment of numerous diseases, both abroad and among the American Indians and pioneers. On the frontier, those seized with ague were plied with a hot concoction, somewhat like ginger tea, made by boiling the roots of the calamus. The Menomini Indians, of what is now Wisconsin, considered the roots a powerful cure for stomach cramps. The dose usually administered was a piece of root as long as "the length of a finger-joint." At one time, calamus root was supposed to be beneficial as a stimulant in cases of typhoid fever. In northern Ohio, pioneer doctors made a tea by steeping sweet flag roots in water and used it as a cure for diarrhea. And, in the Great Lakes region, the Meskwaki Indians employed the juices of the root as a remedy for burns and as a cure for persistent coughs.

The Pawnee of the Missouri region prized it both for medicinal and ritualistic uses. They also used its seeds for beads. Such uses are thought to have resulted in its spread in the region now known as Nebraska, where it is now found principally near the old Pawnee village

sites. All the tribes of that general region held the plant in high esteem. According to Gilmore "It was used as a carminative, a decoction was drunk for fever, and the rootstock was chewed as a cough remedy, and as a remedy for toothache. For colic an infusion of the pounded root was drunk. As a remedy for colds the rootstock was chewed or a decoction was drunk, or it was used in the smoke treatment. In fact this part of the plant seems to have been regarded as a panacea. When a hunting party came to a place where the calamus grew the young men gathered the green blades and braided them into garlands, which they wore around the neck for their pleasant odor. . . .

"Among the Teton Dakota in old times warriors chewed the rootstock to a paste, which they rubbed on the face to prevent excitement and fear in the presence of the enemy."

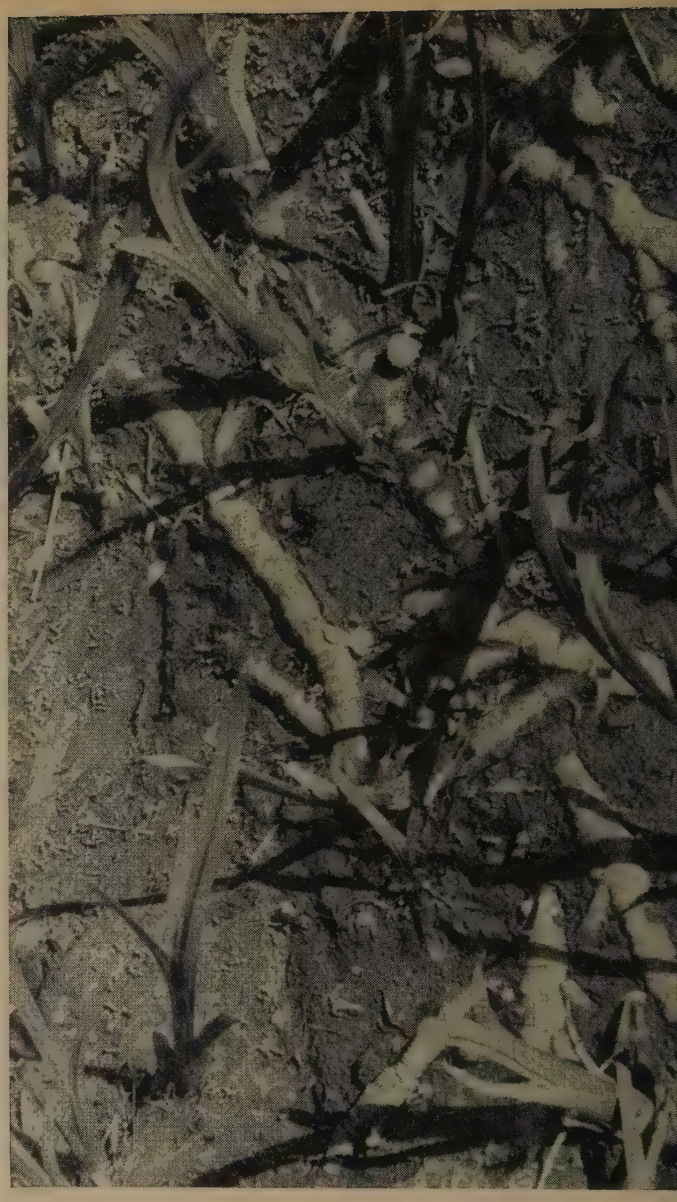
The most widespread of all uses for this lowland plant has been in the treatment of dyspepsia. At one time, it was common practice for sufferers from this stomach ailment to carry little boxes of candied calamus root in their pockets. From time to time, they would extract a small square and chew it slowly, trying to make it last as long as possible. This treatment was supposed to increase the flow of saliva and to tone up the stomach. This practice was continued down to comparatively recent times. The drug, calamus, a powder obtained from the roots, is still listed in pharmacopoeias, even though other drugs have largely supplanted it in the treatment of stomach disorders.

That the candied root was far from an unpleasant medicine to take is attested by the fact that the same material was widely used as a sweetmeat. At one time, this confection was sold regularly on the streets of Boston. In Holland, boys used to chew calamus root much in the manner that modern children chew gum. Country people, all the way from New England to Minnesota, prepared the candied roots as a winter confection and tonic.

In preparing this calamus sweetmeat, the roots were washed and cut into thin slices. After being boiled for some time, they were placed in a thick sugar syrup and boiled again. When dried, the slices resembled candied ginger. The tender base of the stalk was sometimes candied in addition to the roots.

Other uses for these swamp-grown roots covered a wide range in by-gone years. As a powder, they appeared in sachet and toilet mixtures. As a distilled oil, they aided in the concoction of perfumes. An expensive brand of French snuff was flavored with sweet flag root, and, in England, the peculiar flavor of certain beers came from the same ingredient. In Ceylon, the powdered root has been employed as an insecticide to kill fleas. Sprinkled around the base of a tree, it was believed to keep away termites. Pioneers sometimes used sweet flag root as a flavoring substitute for nutmeg and ginger, and in many parts of the world it has found favor as a breath sweetener.

Usually, the commercial harvest of the roots occurred when they were two or three years old. By that time, they had attained their full size without becoming hollow inside. Late autumn and early spring were harvest-time for calamus roots.



The roots of *Acorus calamus* spread out to form an interlacing mat from which spring the slender and sword-like leaves. The root has had many uses.

Not only these roots, but other parts of the plant as well, were valued highly in former days. The whole plant, at one time, was employed in tanning leather. The leaves were used by some Indian tribes in the construction of summer wigwams. The same material found a place in thatching early churches in Norfolk, England. Because all parts of the plant have an agreeable odor, the leaves were often strewn like rushes over the floors of English churches during festivals.

Curiously enough it was this custom associated with the sweet flag that contributed to the downfall of Cardinal Wolsey in the days of Henry VIII. Because calamus did not grow near London at that time, Cardinal Wolsey had the leaves brought at considerable expense from the lowlands of Norfolk and Suffolk in

The leaves of *A. calamus* grow quickly in spring days. In this stand of leaves they reach almost as high as a six-foot man, none other than the author.

order to strew them daily over his floors. Among the charges brought against him—charges that led to his dramatic last days as recorded in William Shakespeare's *Henry VIII*—was one to the effect that he had been extravagant in his spending for sweet flag leaves.

Although these leaves suggest those of the iris, at first glance, the calamus is a member of a far different family. It is a close relative of the jack-in-the-pulpit and the skunk cabbage. Wherever rushes and reeds can grow, the sweet flag can find a home. It is said to have been introduced originally into Central Europe from the mountains of India at some remote time. In France, the sweet flag has been used widely as an ornamental plant beside watercourses and along the borders of lakes.

Each spring, during the last days of May and the early part of June, I catch sight of golden, thumblike projections standing out among the tangle of sweet flag leaves beside my swamp stream. They resemble, on closer view, tiny ears of yellow corn. Each is about three inches long and half an inch in diameter. Covering the surface are tiny, stemless florets like kernels on a cob. Among botanists this structure is known as a spadix. The word comes from the Greek and originally referred to a palm branch broken off with its fruit. Unlike the jack-in-the-pulpit and the skunk cabbage, the spadix of the sweet flag is not surrounded by a spathe or hood. The green, leaflike extension of the calamus stalk, to which the projecting spadix is attached, is, in reality, a spathe. It is slender and elongated instead of hood-shaped.

Scientists have discovered an interesting fact about the flowering of the sweet flag. Considerable heat is generated within the plant at the time when these projections come into bloom. As a result, the calamus plant "runs a fever." Its temperature actually rises above that of the surrounding air during its flowering period.

In the rapid spread of this plant, a spread that often eliminates other forms of vegetation from the spot where it takes its stand, the spadix is usually of less importance than the root. Propagation is accomplished, as in the iris, by dividing the rootstock in the fall or early spring. Lying close to the surface and frequently half exposed in the wet soil, these roots spread out until they produce a matted carpet. From this root-carpet spring the thousands of green sword-leaves that lift their points a yard or more above the damp soil.

These leaves, familiar from Maine to Minnesota and as far south as Texas, reveal the presence of a root long associated with the activities of man. To the early pioneers, a stand of calamus was a heartening sight. It represented a plentiful supply of a highly-valued drug to be found in Nature's outdoor medicine-chest.

★

Birds and Men

By SAMUEL A. HARPER

I listened tense above the roar of planes,
The lusty shouting of our marching men,
To catch the far, faint music of the birds
Hung in the tangled tapestry of May.

Their passion as before was only song
And beauty, all unquenched by din of war.
Their's but the will to be—
Our's but to kill!

Hundreds of thousands of Americans who had not before enjoyed such an experience have this year dug their fingers into the good earth and learned of the pleasure it holds.

With the coming of autumn, however, it is not necessary to rest on our laurels. Much may now be done in the Victory Garden, both with late crops and preparing for next year.

Much of the success of your Victory Garden next year depends upon heeding some—

Fall Garden Facts

By ANDREW S. WING

As SUMMER fades and nights grow cool the average gardener is inclined to harvest his crop and rest on what laurels he has. That may be justified in normal times but not in days of war-time food scarcity. It is a race against frost to get every last ounce of food that is possible from the home food garden. There is still time to grow vegetables, to do much that needs to be done to keep the garden going, and to get it ready for bigger and better things next year.

In the deep South all-year gardens are possible, in the mid-South frost is late in coming, but even in the North a late crop of lettuce, radishes and mustard greens is possible and highly desirable. Start these things in a vacant row from seed, give them a generous side dressing of quick-acting plant food to encourage them, and you will have a crop before heavy frost comes. Mid-August is, of course, too late to plant long-season or very tender crops such as corn, beans, egg plant or squashes, but you should have an abundance of those from earlier plantings if your garden is of sufficient size and carefully planned. Tomatoes should be in their prime now and need only careful tying up, the pruning off of superfluous side branches, and an occasional weeding.

Cool nights and shorter days are fine for such things as endive, Cos lettuce and Chinese cabbage, while a catch crop of late turnips may be broadcast between the rows of other crops after a light cultivation. You may not get a crop from *all* these things, but it is worth a chance. Most gardeners have odds and ends of seed left from earlier plantings. Good gardeners do not waste seed, but better to risk a little seed if there is a possibility of a crop rather than to hold it over for another year. Present prospects for a good vegetable seed crop this year are bright, so let us not worry about next year's seed until the time comes.

The fertilizer used should be as rich and quick-acting as you can get so as to keep the new crops coming along. Not only is the time element important, but also speedy growth makes for finer quality. If the soil is dry, give the rows a thorough soaking after seeding, to be followed by weekly waterings until rain comes. You have probably noticed that a sure way to make it rain is to water the garden.

If your garden is not adequately supplied with fruit

The smile on this young lady's face is one of pride and satisfaction as she harvests her tomatoes from the plants she had tended in the program of the School Garden Department sponsored by the Cleveland Board of Education.

trees, berry bushes and grape vines to provide fruit for home use, in many sections fall is an ideal time to plant them. Fall planting is coming more to the front in many parts of the country. It is best, however, to check with local experts, such as Victory Garden chairmen, county agents, or the state agricultural college, as to your locality. Any good nurseryman will give you sound and impartial advice on fall planting. If you happen to live where fall planting is as good—or better—than spring planting, by all means give it a trial. The chances are that it will pay real dividends in time saved in bringing a crop to maturity.

There are several good reasons why fall planting pays. Nursery stock shipped in the autumn is freshly dug. The plants are full of vigor, even though they may be dormant. If carefully planted and watered, the roots will begin to grow almost immediately, even though the tops show no life except in bud development. There is little danger of winter damage except in the northernmost states, and, curiously enough, in parts of the mid-South. By spring the roots are fully established and the plant starts growth as soon as frost leaves the ground. Buds swell at the normal time and good growth is made the first season. Most nursery stock sold in the spring has been kept in dormant storage all winter, so even though it is planted early, the roots are asleep and the plant takes several weeks to wake up. The first season not much growth can be expected from most species. Indeed, a lot of the nursery stock sold by department stores and the cheaper nurseries is so "dormant" that it never does grow. Do not waste your money and valuable time on stuff of this kind. No plant is a bargain that will not grow, or that turns out to be something else than what you wanted. First class stock does not necessarily have to be large or expensive. Healthy, vigorous trees and shrubs may be had in the smaller sizes, and frequently these will come along faster than the larger ones.

Every home should have an apple tree or two, and a few of the other fruit trees if there is room. If your garden is small and already crowded with shade trees, a few dwarf trees may be fitted into corners or trained against the house, garage, or board or wire fence. These will not yield large crops, but they will give you delicious fruit in season. Also, they have the decided advantage of being easy to prune and spray. The larger trees will require a power sprayer to do a thorough job. And may I hasten to add that unless you *do* intend to spray your fruit trees, bushes and vines *better not plant them at all.* All of the fruits are inviting to insects. Fruit is too precious these days to allow the worms to feast on it. Grape vines and other fruits are alluring to the Japanese beetle, so if you are not prepared to spray them several times a season you will attract all the beetles in the neighborhood. Pruning is also necessary, but that may be done in late fall, in winter or very early spring and is never much of a chore on a small place.

May I, therefore, suggest that you consider planting this fall, in case you do not have as much fruit as you would like, at least a few of the following:

Two apple trees, one peach or nectarine, one sour cherry, two grape vines, two gooseberry bushes, two currant bushes, and a row of brambles (raspberries or blackberries). The bush fruits and brambles may be set in one end of the vegetable garden with row crops planted in between. The grapes may be trained against the wall of the garage, over the kitchen porch or pergola, and will occupy very little ground space. The larger trees will be attractive additions to the general planting, and when in bloom will be bowers of beauty. Many small home grounds are overplanted now with trees of inferior quality, or with short-lived species such as poplars and willows. The removal of a few of these would make room for fruit trees, thus combining beauty with utility.

The autumn months are also a good time to plant strawberries, rhubarb and asparagus. These will be-

come established and will yield from six months to a year earlier, although they cannot safely be harvested the following season. Directions for planting as supplied by the nursery should be carefully followed. Some protection by mulching is usually advisable the first winter.

Fall-planted roses have done much better in my Connecticut garden than those planted in the spring. September is also a good month to move evergreens, any time after growth has stopped. Balled-and-bagged stock is best, and care must be taken to set at the proper level. Never allow evergreen roots to become dry—it is usually fatal. Irises and peonies are usually moved in late summer or early autumn, as are also the spring-flowering bulbs. Now is also an excellent time to go over your perennial borders with an eagle eye and a stony heart, discarding all off colors and second-rate stuff and filling in with newer and better varieties or species.

Then there is the lawn to consider. If yours is hopelessly choked with crab grass, riddled by beetle grubs, or just plain run out, it might be a good idea to dig it up and reseed it. If you need more space for vegetables, leave some room for a Victory Garden for a season or two. It will be good for the soil. Fall is the ideal time to sow lawn grass. Not only will the grass outstrip the weeds, but it will keep on growing long after the first light freezes and will be ready to go to town next season before the weeds get a start. Use only the best of seed, do not spare the fertilizer and if beetle grubs are present give them a dose of arsenate of lead at the time of seeding, washing it in well so as not to endanger the lives of pets and children. This advice is only for those with small lawns. Owners of large places would do well to wait until after the war to expend valuable labor, fertilizer and insecticides on lawn rejuvenation.

If your Victory Garden plot is small and you are planning to enlarge it by digging up some lawn, or by using a field or vacant lot that has not been plowed in some time, better start to get it into shape now. Fall spading or plowing is always preferable with new ground, as the grass roots and weeds rot down during the winter, while frost action on the soil makes it mellow and friable. Many people like to spade their gardens in the fall, but, of course, it will need to be spaded again in the spring, or at least given a thorough stirring.

A better idea with an established garden is to sow a cover crop as soon as the first heavy frost occurs. Rye or crimson clover may be used. Rye and winter vetch (another legume) is another good combination. The cover crop will control erosion, hold fertility, and, in the case of legumes, valuable nitrogen will be captured from the air by root bacteria. To plant a cover crop give the garden a thorough cultivation, broadcast the seed evenly and then rake it in. A light dressing of fertilizer may be used, but is not necessary. Spade under the cover crop the following spring as soon as the ground can be worked. This is one of the best ways to add organic matter to the soil.

Now is the time to start a compost heap if it has not already been started. Simply make a heap in an obscure corner, or dig a pit if your ground is well-drained. Some people like to build a frame about two and one-half feet high and eight or ten feet square. The refuse from the garden, grass clippings, vegetable tops and parings—anything containing organic matter—may be used, provided it is not diseased or full of insects. A layer of about four inches of vegetable matter is alternated with a similar layer of soil with a light sprinkling of lime in between to keep the mass sweet. Decomposition is more rapid if the compost is alkaline and also kept moist. The addition of a complete fertilizer fairly high in nitrogen also hastens bacterial action and makes the finished product richer, more like "artificial manure". If you can spare the time, an occasional turning over of the compost with a spade will hasten the rotting-down process.

Garden sanitation should be practiced diligently all summer, but is especially necessary in the autumn. Now is the time to destroy every diseased leaf, every corn stalk that may harbor a corn borer, every plant that is badly infested with (Continued on page 385)

Autumn's Lesson

By M. L. ALLIS

Autumn tapped me on the shoulder
As I walked the woods today,
And pointed to the drifted leaves
That in the hollows lay.

She swept the foliage from a bush
That stood beside a spring,
And smiled when I saw there revealed
A nest of grass and string.

She slipped her fingers o'er a bough
Of hazel, till it glowed
With spidery, yellow blossoms,
Close by the forest road.

She patted down the brown pine rugs,
And closer pressed each fern,
For well she knew that Winter's reign
Would be both cold and stern.

She tweaked the beech tree's papery leaves,
Remembering they might cling
And neighbor with the russet oak
Until again 'twas Spring.

She peeked to see if partridge vines
Were gemmed with berries red,
And listened at the woodchuck's hole
To find him safe in bed.

Where'er she paused, the ripened leaves
Fell softly to the ground.
'Twas thus I learned how Autumn
Spreads her coverlets around.

Afraid of the Long-Sting?—It's Friendly!

By ALICE SPENCER COOK

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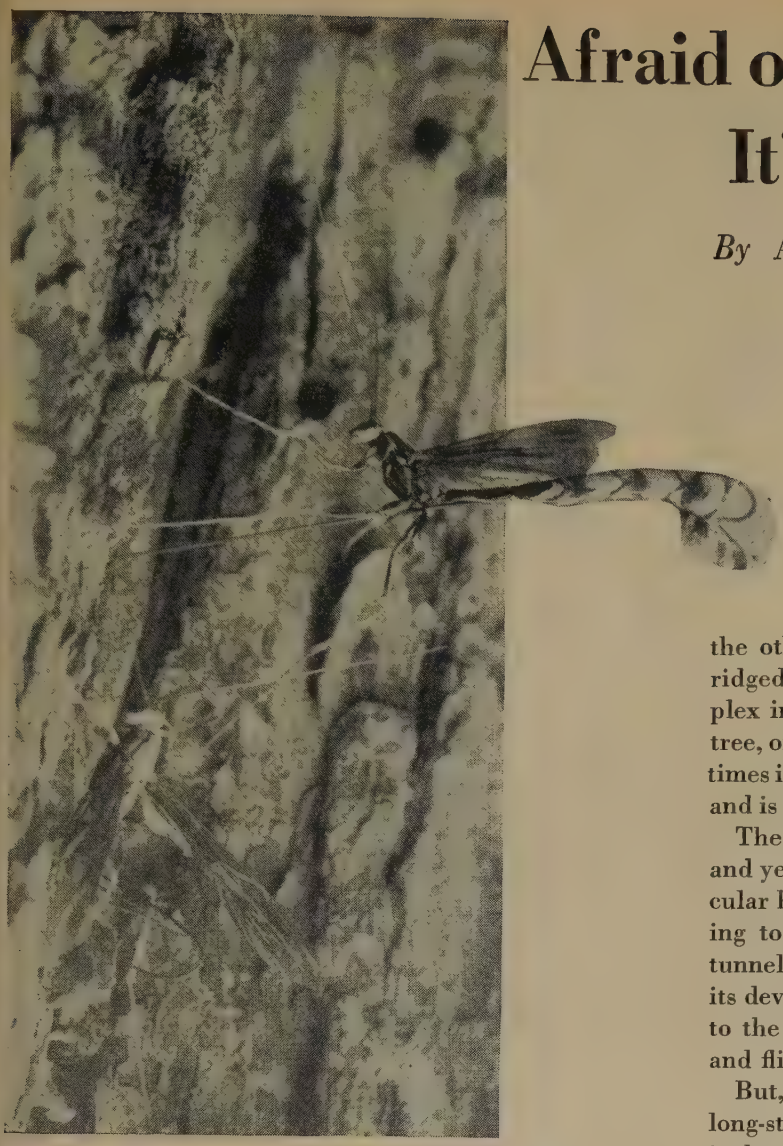

The ichneumon wasp thrusts its long ovipositor into the bark of the tree, perhaps seeking the larva of the pigeon horntail on which it preys. Indistinctly, below the boring wasp, is shown another that seems to have exhausted itself.

In June, when the lazy summer air is filled with the hum of myriad insects, you may have been startled by a giant black and yellow "long-sting" or ichneumon wasp, flying hither, thither and yon. Its body is an inch and a half long and its sting-like ovipositor is nearly twice that length and as flexible as a horse hair, which it resembles. It measures nearly six inches from the tip of its antennae to the ovipositor tip, and its short jerky flight and vibrating antennae are fearsome.

As a matter of fact, however, this insect is one of the most beneficial known to man for it destroys the larva of the "pigeon horntail", a wood-boring insect that is injurious to practically all western conifers.

The pigeon horntail is about as large around as a medium-sized pencil and approximately an inch and a half long. It is dark blue, black or marked with orange and red. The wings are smoke color and transparent. The legs are dull yellow.

The ovipositor consists of five long slender pieces. The two outside pieces are grooved on the inner surface and, when joined, make a sheath containing the other three pieces. One of these pieces is nearly cylindrical and is channelled beneath for the reception of the other two, which are very slender and stiff and ridged at the tip like the teeth of a file. With this complex instrument, the female bores a deep hole into a tree, often for an inch or more, and lays its eggs. Sometimes it is unable to extract its ovipositor from the wood and is held there until it dies.

The grub that hatches from the egg is cylindrical and yellowish-white. As it feeds it makes perfectly circular holes in the solid wood with no opening extending to the outside. It packs the boring dust in the tunnel behind it, taking one to two seasons to complete its development. It transforms within a cocoon, creeps to the mouth of the tunnel, gnaws through the bark and flies off.

But, often, along comes the ichneumon wasp, the long-sting. Elevating its long ovipositor in a loop over its back, with its tip on the bark of the tree, it makes a derrick of its body, and, with marvelous skill and precision, drills a hole into the heartwood.

How this long-sting can thrust its marvelously thin ovipositor into the tree trunk, sometimes penetrating two to three inches of solid wood until it strikes the tunnel of the wood-boring larva, is one of the marvels of Nature. By what feat of engineering it locates the position of the wood-boring larva is even more wonderful. Some scientists say it is by the sound the wood-borer makes as it tunnels through the wood, but others discount this theory with the flat statement that these wasps have no auditory organs.

At any rate it does locate the wood borer and when its tunnel is reached, it deposits its egg in it. When the egg hatches, the long-sting crawls along the tunnel until it reaches the seemingly inaccessible wood borer. With diabolical cunning, it is careful not to injure vital organs, for it wants the borer to remain alive so it can continue feeding on it by sucking its blood. The helpless borer serves as food for the long-sting larva until it is full grown and has transformed to a pupa. Finally, the adult long-sting gnaws a hole through the bark, and the life cycle of the insect is completed.

Bicknell's Geranium

By LOUISA R. GLEASON

ONE of our interesting native wild flowers is the modest little Bicknell's geranium, *Geranium bicknellii.* Its small rose-colored blossoms grow in pairs and are quite insignificant in appearance. The plant is of so little apparent consequence that it has not received a common name as have its cousins—showy wild cranesbill and the aggressive immigrant herb Robert. Yet it has an attractive and distinctive feature, appearing late in life, that sets it apart for attention.

Long before Coney Island tempted venturesome youth with a giant aerial boat swing, Bicknell's geranium was arranging its seed boats in that same design, but with no intention of keeping its youth safely within the boats' gunwales.

After blossoming time, the fruit begins to ripen with an elongation of the flower axis. As it develops, the axis, surrounded by its five carpels, becomes erect, and, like a mast, serves as a support for the thread-like styles fastened at its top. At the base of the mast, each style is connected at the tip of one end of a seed vessel or little closed boat, the five boats, in a compact group, resting in cradles made by the calyx. When the seeds within the boats are ripe the styles contract, pulling the boats out of their protective moorings, and sending them aloft (as illustrated), upside down and open, to discharge cargoes. If the weather is damp, the styles are slow to contract, and, too, they seem to prefer to act in daylight. Sometimes the boats do not unload both of their seeds at the first reversal, so they are let down lightly into their home berths to rest for the night. The next day the boats are swung out again, the last seed is flung from the mother plant, and the little boats stand on end, empty and stiff.

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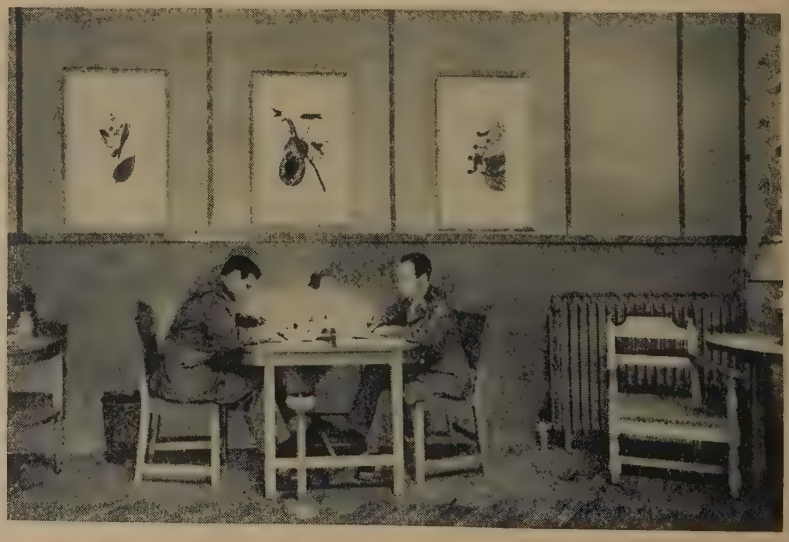

Two soldiers from Camp Breckinridge write in the Audubon Room at the Henderson, Kentucky, USO Club. On the wall are three original engravings made in England from the artist's originals. They picture the golden-crested wren, the purple martin and the republic cliff swallow. The room is on the very location of Audubon's home in Henderson, and on the property next door stood his general store. John James Audubon lived in Henderson from 1810 to 1819.

Audubon and the USO

CAMP BRECKINRIDGE happens to be near the town of Henderson, Kentucky, which was the home of John James Audubon from 1810 to 1819, a fact of which the citizens of Henderson are very proud. Miss Lois Fair, one of the USO directors in Henderson, had the interesting idea of turning one of the rooms

of the club into an Audubon Room. She has collected various bits of Audubonia from the local people. In this she has been assisted by Miss Nell Dishman, curator of the Audubon Museum, which is located in lovely surroundings at the Audubon Memorial State Park in Henderson. Miss Susan Towles, a Henderson librarian, has lent from her collection three of the first engravings made in England from *Birds of America.* The Museum has lent a handsome print of the turkey cock, a cast of the Museum, and a photograph of John James Audubon. They have also collected other photographs, prints, and typed excerpts relating to the Henderson phase of Audubon's life. These are attractively framed.

Miss Fair has also acquired a first edition of Audubon's *Birds of America,* which includes the thirty-two prints not in the second printing. This is a very large book resting on a dictionary stand and it can be rolled around the room and used for reference. The library also includes two copies of Donald Culross Peattie's *Singing in the Wilderness.* Pamphlets and photographs showing the State Park and Museum will encourage both the soldiers from the nearby Camp Breckinridge and the civilians who visit the Club to explore further into the life and work of Audubon.

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The Western Gull

By JOHN LINDSEY BLACKFORD

IF THERE IS any sound, along its far-flung shores, to compete with the booming surf as the voice of the sea, then it is the wild crying of gulls. The ancient sea-mother has taught many of her children to become greater mariners than they; but I doubt if any others have so verily expressed to men the intangible mystery and lure of the deep. One cannot long hear their strident screaming, or observe the ease with which they trim their white sails to the strong wind, and be spared that ceaseless urge to adventure on the heaving brine. One knows then what great part they must have had in times past in stirring the wild blood of reckless rovers to seek the far lands and trackless waters of the globe.

The western gull, like others of his kind, is more beachcomber than sailor. Belying his appearance of an honest tar, he is more pirate than either. He is also an efficient scavenger. Larger than most Pacific gulls, the bird is distinguished by a dark, slaty mantle; very stout, deep-yellow bill; and more extensive markings of black on the undersurface of the primaries. Alone among coast gulls, his head and neck remain pure white in the winter plumage. Only with their fourth year do they attain mature feathering.

The bird ranges and breeds along our Pacific shores from British Columbia to the Tres Marias southward of Cape San Lucas at the tip of Baja California. With the devotion of all old salts to the sea, and unlike several other related species, the western gull may rarely be seen inland from the silvery beaches, the cliffed shore and the outlying coastal islands. On the latter, particularly, he is known as a raider of nesting colonies. There the buccaneering of whole crews of gulls, working together among the incubating murres, cormorants and auklets, is sometimes noted with alarm; yet it is evident that all these seafarers thrived when they were harried by no deadlier enemy. Where natural depredations assume serious character, it is usually because man's invasion has already upset previously normal relationships.

I like the western gull. There is a certain something in his swashbuckling demeanor, his rolling gait and keen weather eye as he mans the wharfside piling. His interest in ocean-going craft and his knowledge of the tides make him wholly and completely a citizen of the sea. And, if histories read aright, he is not the first hearty lad to have shipped under the Jolly Roger.

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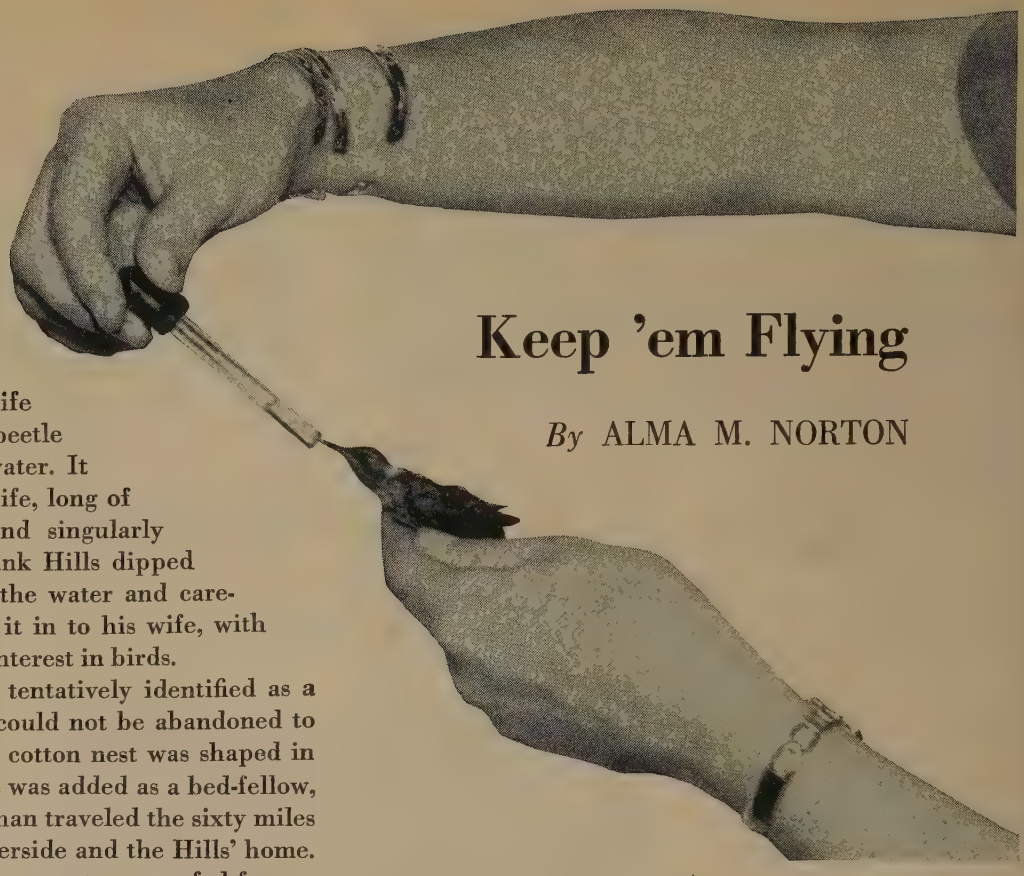

Long of bill and naked of feathers, the little hummer was nursed to full strength through a medicine dropper of honey and water.

Keep 'em Flying

By ALMA M. NORTON

It was a tiny speck of life wriggling like a dark beetle in a shallow pool of water. It was, in fact, a bit of bird life, long of bill, naked of feathers and singularly lacking in charm. Yet Frank Hills dipped the struggling atom from the water and carefully and gingerly carried it in to his wife, with whom he shares an active interest in birds.

Dried out, the waif was tentatively identified as a calliope hummingbird. It could not be abandoned to cruel fate, so a diminutive cotton nest was shaped in a berry box. A warm bottle was added as a bed-fellow, and in such luxury the orphan traveled the sixty miles from Laguna Beach to Riverside and the Hills' home.

Surviving the trip, the tiny creature was fed from a medicine dropper filled with honey and water. He thrived so well that soon he could grip with his claws and sip from a deep and slender bottle of honey water tied handily to his perch. He soon learned self-service.

In due time feathers came. Then followed flights about the house, from perch to curtain rod and back. Soon the pleasant garden, with a stretched clothes line for an outdoor perch, broadened Calliope's horizons. From this vantage point some dizzy flights were tried, from the results of which he often had to be rescued. Then he had the thrill of sipping from the pale yellow blossoms from the tobacco tree and others from honeysuckle, gathered especially for him.

One incident marred Calliope's early flying experience. One day he had played at flying so long that his wings seemed to fail him in air. Like a disabled airplane he nose-dived into a pan of soapy water, and was rescued a second time from a watery grave.

Soon iridescent glints began to show in the bird's fine feathers. Others of his kind visited the garden and he joined them, a hummingbird fortunate in disaster to have met humans who wanted to "keep 'em flying."

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Tears

By U. C. DEIKE

I wonder if the rain might be
The treasured crop of tears
That God has gathered carefully
From human trials, and fears!

April showers that patter down
So soft and soothingly
Might represent the friendliness
Of tears of sympathy.

And in the summer thunderstorm,
When lightning splits the sky,
These rains might be the tears of rage,
Or anguish, long passed by.

For since Creation, tears have flown
So fast and constantly
They separate all continents,
And salt each heaving sea.

Some day, there'll be a Holy reign!
All evil things will cease,
And in the place of selfishness
There'll be eternal peace.

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Time given is Standard Time; add one hour for War Time.

Sunspot Group of a New Cycle

By ISABEL M. LEWIS

A NEW sunspot cycle has been introduced with the appearance of a small group of sunspots in the southern hemisphere of the sun far from the solar equator. These appear even as spots of the old cycle, still on the face of the sun, are gradually fading out in low solar latitudes.

It was on May 16, at 9 A.M., P.W.T., that Edison Hoge at the Mt. Wilson Observatory observed this sunspot group and tested its magnetic polarity, which was opposite to that of the old cycle group in the same hemisphere of the sun. This reversal of polarity, along with the fact that it appeared at a high solar latitude, was proof that the group belonged to a new sunspot cycle.

On May 17 at 1:15 P.M., E.W.T., Mrs. L. T. Day, at the U. S. Naval Observatory, photographed the group with the five-inch photoheliograph. There, on every clear day, the sun has his face photographed; the positions and areas of sunspot groups are measured and life histories are on record, covering a period of many years, of spots that are visible on the sun. Many spot groups are carried around several times by the rotation of the sun before they finally break up and disappear. Some have records of causing great disturbances to radio and telegraphic communications on the earth as they transit the face of the sun.

This spot group of the new cycle was remarkable for the fact that it appeared between south solar latitudes of 40 and 44 degrees. The zones of the solar surface within which sunspots usually appear lie between 5 and 40 degrees of solar latitude in each hemisphere. It is rare that a sunspot appears within 5 degrees of the equator, or more than 40 degrees

from the equator. Not since the year 1889 has a spot of a new cycle appeared at such a high latitude. Spots of a new cycle generally appear about 30 degrees north or south of the solar equator, and, as the cycle of 11½ years average duration continues, later groups appear nearer the equator until at time of sunspot maximum, five or six years after the minimum, spots appear in greatest numbers about fifteen degrees north and south of the equator. As the next sunspot minimum arrives spots of the old cycle may often be seen a few degrees from the solar equator, persisting for some time after spots of the new cycle, high in solar latitude and reversed in magnetic polarity have made their appearance.

The sunspot group of May 16 was observed near the edge of the sun's disk and was soon carried out of view by the rotation of the sun. It was possible that it might return after an interval of about two weeks, as the sun turns once on its axis in about 25 days; again it might break up and disappear before this time was up; and that is what happened. Early in June, when the group was due to appear if still in existence, the serene face of the sun showed no blemish that could be attributed to its return. It will probably not be long, however, before more of these solar storms belonging to the new cycle appear in gradually increasing numbers, while spots belonging to the old cycle will finally disappear completely from Old Sol's face.

During August and September we may expect the usually large number of meteors observed at this time of year, particularly around the time when the Perseids, largest of all the annual swarms of meteors, present their maximum display on August 12. They put on their show in the early morning hours before sunrise.

On August 1 there will be an annular eclipse of the sun. The path of the annular phase of the eclipse will pass close to the southwestern tip of the Australian coast. Partial phases of this eclipse will be visible in all parts of Australia, but the magnitude will be greatest in the southwestern and southern part, and least in the northern part of the country. The northern limit of the eclipse will pass through the northern part of Borneo and southern part of New Guinea. It will also cross the Malay Peninsula, and the eclipse will be visible over a large part of the Indian Ocean at or near sunrise and in the early morning. It will occur near sunset along the east coast of Australia. In New Zealand the sun will set eclipsed. A partial eclipse of the moon, with its greatest magnitude about 88 per cent, will occur on August 15 in the western Pacific, Australia, New Zealand, Indian Ocean, Asia, Europe and Africa, as well as in the eastern and southern parts of the Atlantic Ocean. (Continued on page 385)

In ten more minutes what will you be doing?

IN TEN MORE MINUTES they'll be in action—American fighters risking life and limb to conquer one more bridgehead on the road to freedom.

And in ten more minutes—what will *you* be doing to help win this war?

Because it's up to you as much as it's up to them. Unless you—and all the rest of us at home—are devoting every spare minute of our time to fighting this war as civilians, *their* chances of victory are slim.

Next time you read of an American raid on enemy positions—with its tragic footnote of lost planes and ships and men—ask yourself:

"What *more* can I do today for freedom? What *more* can I do tomorrow that will save the lives of men like this and help them win the war?"

* * *

To help you find *your* place in America's War for Freedom, the Government has organized the Citizens Service Corps as part of local Defense Councils. Probably there is one of these Corps operating now in your community. Give it your full co-operation. If none exists, help organize one.

Write to this magazine for a free booklet, "You and the War," telling you what to do and how to do it. This is *your* war. Help win it. Choose what you will do now!

EVERY CIVILIAN A FIGHTER

Contributed by the Magazine Publishers of America

The School Page

By E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

Desk Drawer Dregs

WHEN one gets married, he burns his old love-letters—or should. When one moves, changes his job, or plans going into the Army, he begins to put things into order. One of these tasks is cleaning from the desk drawer the accumulation of little appealing things, some fine, some terrible, some funny. Every teacher, no doubt, has such a drawer.

From a great pile of such matter just cleaned from a desk (I thought I was Army-bound), I have gleaned three small piles. One deals with what teachers here are doing; another, with what teachers in Europe are doing; and the third, which happens to be ridiculous, deals with what some teachers have said they wanted to do. Whatever you may do with the rest of this article, do not fail to read the closing section.

What Some Teachers Have Been Doing Here. On a piece of scrap paper, I find a record taken from a bulletin-board at Beechwood, a private sanctuary maintained near Collegeboro, Georgia, by R. J. H. DeLoach who taught in one of the schools made famous when a Georgia ex-governor kicked out the president. You all heard of the political intrigue, but how many ever heard of this sanctuary? The notice says:

"This property being suitable for certain kinds of observation, study and research along the general lines of biology and natural history, is this day dedicated to the furtherance of Nature Education, to the conservation of our local wildlife and to the service of serious students, writers and other citizens who may find time for a sojourn here to refresh their souls at Nature's fountain of health.

"The names signed hereto have been partly responsible for the inspiration of this ideal, and may each member of this and of succeeding classes give abundantly of their lives and talents to the furtherance of this type of service to the state, to the country and to God."

Somehow this sanctuary—which I visited—and this notice—which I copied—stuck in my mind for years. When the opportunity presented itself, I, too, bought a tract of wild land that I hope will do for my region what Beechwood will do for Georgia, what Dallas Lore Sharp's little sanctuary did for Hingham, (See *Nature Magazine*, Vol. 5, page 113) and what hundreds of other sanctuaries have done and are doing for other areas. A nurse who was a former student of mine heard of Beechwood, bought herself a little farm for the same general purpose and just now is disturbed about whether she should put its poor soil into food production. What do you think? Are you doing anything along these lines in your area?

A letter from a biology teacher tells of a new teacher who began ninth grade biology by stimulating a frog with electricity, dissecting it and seeing how long the heart would beat free from the animal. The mature teacher was appalled at what the novice was doing until she remembered that all the embryo pedagogue had had in biology was what she herself had taught her. She writes: "I sank in my chair, too weak to stand, for I was that girl's teacher. I spent the next two hours trying to undo what I had done eight years ago and I tremble to think what that girl may have done to those children". If there is a lesson in this for you, then no further comment is necessary.

A former graduate student had once left on my desk this note from Professor Joseph Leidy: "The information possessed by a country boy, gained by intelligent observation of the birds and plants of his neighborhood, is viewed by the so-called educated community as insignificant in comparison with that of the college boy who can relate stories of classical history of persons who never existed and events that never occurred." Evidently here is another bond between science teachers. It should help us these days. Nothing further need be said.

What Teachers Are Doing in Europe. A letter from an editor for the British Royal Society for the Protection of Birds compares American science books for teachers with those of the British, saying: "American science books have a clear superiority over a majority of English ones in that the real effort in American books is to make the reader and learner *comprehend* the matter. In our books and schools it often seems to me that the first aim is to stress the vast learning of the writer and to make this obvious by *in*comprehensibility. Even in schools one feels too often the conscious superiority of the 'see-how-clever-I-am' teacher. You on the other hand show how problems may be simplified and 'brought home' ". It is fortunate for the reputation of our schools here in America that this British critic read *Nature Magazine* and similar literature instead of some of the texts sanctioned for adoption by large groups in America.

What Some Teachers Say They Would Like to Do. I have plenty of splendid statements from teachers outlining things they would like to do, but the desk drawer yielded three letters too priceless to be ignored. They are quoted in a spirit of fun and to show that it is fortunate that some "screening" should be practiced if the ranks of Nature and science teachers are to maintain the standard praised by our British correspondent, quoted above.

A letter received the day before this was written is from a teacher who writes regularly to his local newspaper. He says: "I am a naturalist, therefore know the importance of accuracy". He then asks what one should do about rabbits in a victory garden and says: "We would greatly appreciate any information concerning the economic status of this rabbit; if its meat is editable", etc. and goes on to "asurre (sic) you that such information shall not be distorted" since he knows "the importance of accuracy." Surely, there is need for the broader type of education when a teacher and newspaper writer who boasts of his accuracy wants to know if a rabbit is "editable". How would *you* edit a rabbit?

Another teacher writes regarding work at Cornell, basing his selection of that institution on the answer he gets to this question: "What is size of your diploma in inches, does it have gold seal with ribbons protruding from underneath and how many signatures? The diploma I now have is the small vest-pocket size unsuitable for framing. Would you be willing to have large size made for me 20½x25 inches to fit frame my father used for M.D. if I paid the cost?" Who says college students are interested only in football scores and women?

The prize of all in the drawer comes from an A.B. who wished to carry on graduate work with the assistance of Pack Fellowship funds supplied in cooperation with *Nature Magazine*. The spelling and punctuation here given are carefully preserved. They deserve it. He writes, in part: (Continued on page 388)

SUNSPOT GROUP OF A NEW CYCLE

(Continued from page 382)

Autumn will begin this year on September 23, 6:12 P.M., Eastern War Time, in the northern hemisphere, and spring in the southern hemisphere, as the sun crosses the equator going south.

Mercury will be in the evening sky during August and will be at eastern elongation on August 29, though it will then be within ten degrees of the horizon at sunset and unfavorably placed for observation. It will be in conjunction with the thin crescent moon on August 2, and with Venus on August 17. It will be in conjunction with the sun on September 24, and probably will be too low in the southwest in the early part of that month to be seen at all.

Venus draws closer to the sun during August, although it is still visible for most of the month as a brilliant evening star. On September 5 it will be in conjunction with the sun and will pass then to the morning sky. By the end of the month it will become a brilliant morning star. In the telescope it appears in the crescent phase during these two months.

Mars will be in Taurus during nearly all of August and September, and is high in the southern sky at sunrise the early part of August. It will be due south, in quadrature with the sun at sunrise on August 24. After that date it will rise before midnight, earlier on each successive evening. On September 4 it will pass a few degrees north of Aldebaran in Taurus, which it strongly resembles in color, although it is now far more brilliant. Mars is approaching the earth and steadily increasing in brightness.

Jupiter, which was in conjunction with the sun on July 30, has just passed to the morning sky and will not be visible until later in August.

By the end of August it will rise about two hours before the sun in the northeast in Cancer, passing into Leo during September. It will then be a conspicuous object in the morning sky, a magnitude or more brighter than Mars.

Saturn will remain near the boundary between the constellations of Gemini and Taurus during these two months. It will rise after midnight in the northeast, the middle of August, and on September 20 it will be in quadrature with the sun, when it will rise at midnight and be due south at sunrise. Saturn is about equal in brightness to Vega at this time. Its rings are seen to excellent advantage at nearly their widest opening and the southern surface of the rings is the visible one.

FALL GARDEN FACTS

(Continued from page 376)

plant lice. Every insect or fungus spore destroyed now means fewer plant enemies next season. Spraying and dusting will have controlled most of these bugs and blights during the summer, but those that have escaped should be ruthlessly destroyed before the garden is put to bed for winter. The wormy apples that fall from the tree, and the blighted plums and other fruits should be raked up and removed or destroyed.

Obviously any garden work that can be done now lightens the load the following spring, when the average gardener will be rushed trying to get in his crops between spells of rainy weather. What you do now will give you more time to devote to the all-important job of producing vegetables and fruit in 1944. From the way the food situation looks now, it will probably get worse before it becomes appreciably better. We will need every bit of food we can raise at home next year. The wise gardener is aware of this fact and will keep ahead of schedule by doing as much of his work as possible this fall. Just as on the battlefield, victory comes to those who plan their campaigns wisely in advance.

The Bartrams Down South

John Bartram—Diary of a Journey through the Carolinas, Georgia and Florida. Annotated by Francis Harper. Philadelphia. The American Philosophical Society. New Series—Vol. 33, Part 1, 120 pages. Frontispiece, portrait of John Bartram. 22 plates. $2.00.

John Bartram was born in Chester Co., Pa., in 1699, and died in 1777. He was devoted to the study of plants, and has been called the "Father of American Botany." He was a correspondent of Linnaeus and other European scientists, and established, in 1728, in Philadelphia, the first important botanical garden in America, still existent in part.

In the spring of 1765 Bartram was appointed Botanist to King George III with a salary of fifty pounds a year. In July, accompanied by his young son, William, he set out on a plant-exploring trip

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The ROSICRUCIANS

SAN JOSE [AMORC] CALIFORNIA

to Florida and the Carolinas—a journey he had long wished to make. He was then 66 years old, but having made several trips to remote parts of New England, New York, several points in the Northern Alleghanies, he had trained himself in primitive methods of travel and the enduring of privations. Usually he had no tent, sometimes, however, being able to "lodge under a pine." Bartram's record of the trip ended on April 10, 1766, when he was about to take ship from Charleston, South Carolina.

Bartram's Diary, as now presented, follows strictly the author's spelling and punctuation, excepting the part covering the period from December 19 to February 12, which, because of the loss of the original, is reprinted from an edited version published in London in 1769. This ends on p. 55. The remainder of the work covers Dr. Harper's comments and annotated index, and closes with a bibliography and a general index.

Dr. Harper has been fortunate, in the preparation of this scholarly treatise, to have the cooperation of a large number of interested persons, both in the field, where he retraced most of Bartram's trail, and in the Philadelphia region. Chief among these was the late Arthur N. Leeds of the Department of Botany of the Academy of Natural Sciences. Working together, the editor and Dr. Leeds were able to elucidate many doubtful points regarding the actual route, and to determine the exact localities where important plants were first found. It was the wish of Dr. Leeds' friends who had shared in the effort that the present work should be his memorial, in recognition of the prominent part taken by him in its planning and accomplishment, but he did not live to see its completion. An appreciative memorial account, however, is given at the end of the editor's introduction. E. A. P.

Michigan Conservation

They Need Not Vanish. Edited by Helen M. Martin. Lansing, Michigan. 1942. Michigan Department of Conservation. 294 pages. Illustrated. $1.00.

The subtitle of this interesting book is "A Discussion of the Natural Resources of Michigan." This is generally descriptive of its contents, which represent the State's first attempt to "offer the teachers of the State a coordinated and substantial basis for the teaching of the conservation of our natural resources." In a foreword Conservation Director P. J. Hoffmaster says that this book, together with its companion book, *Learning to Conserve our Natural Resources*, published by the Department of Public Instruction, are intended "to provide for the teacher and the general reader, not only a background of the history of this state's natural resources and what has been done to prevent waste and to promote better uses, but also to furnish practical aid in passing this information and such principles on to the student."

The book is divided into two main sections. The first deals with "The First Two Billion Years", and presents the geological history of Michigan as a background. While this material is interesting, we cannot help feeling that rather more space is given to it than necessary. The second section is entitled "The Last Fifty Thousand Years" and deals with the soil, forest, waters and wildlife of Michigan. The editor has done an excellent job of arranging material provided for this volume by Shirley W. Allen and George C. S. Benson of the University of Michigan; Stannard B. Bergquist, L. R. Schoenmann, H. C. Beeskaw, J. H. Kraemer, W. F. Morofsky, J. A. Porter and E. C. Sackrider of Michigan State College; G. S. McIntire, H. M. Martin, O. F. Poindexter and C. F. Welch of the Department of Conservation; M. G. Adams of the Stream Control Commission; Frank DuMond of the Public Museum at Grand Rapids, and Lynn Heatley of the Midland High School.

A Necessary Directory

Forestry Directory. Compiled by Tom Gill and Ellen C. Dowling. Washington, D. C. 1943. American Tree Association. 411 pages. $2.00.

Nineteen years ago the American Tree Association brought out *The Forestry Almanac*, a compilation of facts and information on forestry and conservation. Two subsequent revised editions were published, but the last previous one was ten years ago. That decade, as Randolph G. Pack, president of the American Tree Association, points out, represents "one of the most important decades in the history of forestry in America." In that time the CCC was born, lived and shelved, for the duration, at least. Important forestry legislation was enacted. Great changes in forestry policy and program were made. Hence this publication, now known as the *Forestry Directory*, had to be completely revised, rewritten and replanned.

The result is a book that is a "must" for anyone concerned with either forestry or conservation. Its scope is amazing. The first sixty-eight pages are devoted to Forestry in the Department of Agriculture, as carried on by the Forest Service and related or cooperating agencies. Then forestry in the Department of the Interior covers the work of several bureaus engaged in forest and conservation work. There follow data on forest history, forest legislation, forestry in the States, farm and community forestry. Particularly valuable for reference is the considerable section devoted to national organizations concerned with forestry, others with conservation programs, and regional, trade and State conservation groups. Other subjects fully covered are the forestry schools, fellowships, demonstration forests, forestry in Canada and in the tropics.

Nothing appears to have been overlooked that might properly appear in this volume. Such few organizations as are missing from the data on conservation groups are absent because of their own failure to supply information, but they are a mere handful. As a source of quick and handy information in the field this book has no close counterpart. Foresters and conservationists are truly indebted to the publishers for making it available at a really nominal price.

State Birds

Slowly the ranks of those States that have not officially chosen State Birds are dwindling. A check of the record reveals as of July 1, 1943, that thirty-two States and the District of Columbia have official bird emblems, most of them by legislative action. This leaves sixteen States whose legislative bodies have failed to act. All of these States have a bird that has, by popular designation, or the positive action of some interested and important group within the State, been at least tentatively accepted as the avian emblem. On the unofficial list are:

Georgia, Brown Thrasher; Kansas, Western Meadowlark; Minnesota, Goldfinch; Mississippi, Mockingbird; Missouri, Bluebird; Nevada, Mountain Bluebird; North Carolina, Carolina Chickadee; New Hampshire, Purple Finch; New Mexico, Roadrunner; New York, Bluebird; Oklahoma, Bobwhite; Rhode Island, Bobwhite; South Dakota, Western Meadowlark; Washington, Willow Goldfinch; West Virginia, Tufted Titmouse; Wisconsin, Robin.

(Continued from page 370)

mals of Eastern United States, which also has had the benefits of art conferred upon it, by portraits of 30 subjects by Earl L. Poole—pleasing and satisfying portraits they are, too, though less imaginative and more faithfully illustrative of details than Mr. Weber's, and perhaps less fortunately adapted to their reproduction by the printer. Here within the confines of one handy volume are the minimum essential aids for studying any of 253 species and subspecies known to be now living east of the Mississippi River, and the volume should certainly inspire Easterners to study the mammals near home.

"What to study?" asks Professor Hamilton. "Every species described in this volume," he declares, "would amply repay study. Of the 253 species and subspecies treated, the young of only 45 have been described; the gestation period of but 25 is certainly known; detailed data on the food habits of less than 20 percent have been recorded. The home life, seasonal differences in food habits, activity cycle, and behavior are known in any detail for less than a dozen."

All who are interested in the outdoors in the East will surely wish to place this volume on their shelves, for with it they can feel that they have a reference and reading work on the mammals of their surroundings comparable with their favorite bird book. Keys to the "orders" of eastern mammals and to the genera of each order are provided in readily understood form and language. The habits of each species are described concisely but with the interest and clarity that come only with the study and experience of an authority like Professor Hamilton. The distribution of the subspecies is defined not only in words but also in a series of maps, and each subspecies is described.

These descriptions, it may be pointed out, are somewhat technical for the popular readers that it is hoped will constitute a large part of Professor Hamilton's audience, and occasionally in his text on habits the author seems rather presumptuous of his general reader's vocabulary—referring casually, for example, to *Sigmodon* runways some 200 pages before the cotton rat has been discussed. In later editions—and undoubtedly this work will merit them—perhaps the introduction can be expanded enough to explain the characters upon which mammal descriptions are based, to gloss the difficulties of such terms as "zygomatic breadth" and "palatal length", and to provide aids for converting metrical measurements to feet and inches or pounds and ounces. These additions would make even more readily and more widely useful a book that, despite a few technicalities, should now be in every general outdoor reader's library.

Meeting the Mammals. By Victor H. Cahalane. New York: The Macmillan Company. 1943. 133 pp., with 67 drawings by Walter A. Weber, end-paper map showing areas of the National Park System west of the Mississippi River, and reading list. $1.75.

The Mammals of Eastern United States: An Account of Recent Land Mammals Occurring East of the Mississippi. By William J. Hamilton, Jr. Ithaca, N. Y.: Comstock Publishing Company, Inc. 432 pp., with 30 portraits by Earl L. Poole, 61 photographs, 14 text drawings, 87 distribution maps, bibliography, and index. $4.

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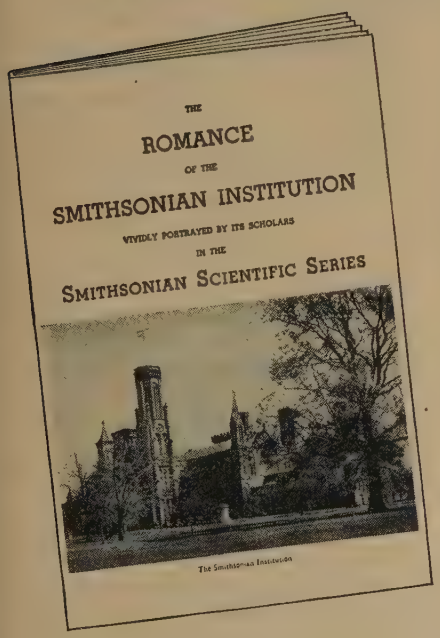

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ATHLETE OF THE SEA

(Continued from page 356)

guide has said to me many times, "Porpoises? Why, they're as intelligent as a dog." Once while fishing with him we ran into a school of kingfish. As fast as we hooked one the gray streak of a porpoise shot up out of the blue depths of the Gulf Stream and cut the fighting king in two. Out of twenty-two we got twenty-one heads and only one whole fish before we gave up, leaving the porpoises to their picnic.

Many times along the keys I have seen porpoises close in on a school of mullet with the craftiness and caution of a fox stalking a partridge. Then with incredible swiftness they rushed into the panic-stricken mass and took their toll.

There are more than twenty different species of dolphins and porpoises found over wide areas from the Arctic Ocean to far up the Amazon, and from the Ganges to the South Pacific. In the Orient they are frequently seen in the rivers hundreds of miles from salt water.

The white-beaked dolphin of the northern seas often travels in vast schools of more than one thousand. The bottle-nose dolphin of the Atlantic Coast is rarely seen in schools of more than one hundred.

In size porpoises range from small seventy-pounders, four feet long, to ten-footers weighing well over five hundred pounds, according to the species. In color they vary from the slate gray of the harbor porpoise to the striking coloration of the Commerson's dolphin with jet black head, tail, and fins, and a diagonal snow-white band around its body.

All porpoises and dolphins breathe through a hole in the top of the head, and some species rise to the surface to breathe every twenty seconds; others remain submerged for intervals of more than two minutes.

Usually they have but one calf a year. In the case of a common harbor porpoise the baby is twenty-five to thirty inches long at birth. While suckling their young the mothers float or swim on their sides in the manner of a whale providing the same service.

One of my unforgettable experiences occurred in the Bahamas several years ago. We were aboard a trading schooner, coasting before a gentle breeze. It was late afternoon and the hot sun poured out of a cloudless sky upon the ebony backs of our Negro crew as they hummed some ancient tune.

Just to windward a three-master from Andros, great patches on her weather-beaten sails, slipped by like a phantom. Then suddenly a great school of porpoises rushed towards us like a herd of wild mustangs. When within a hundred feet of the boat they swerved and circled. Three times they circled us, churning the sea into foam as they cleared the water in graceful leaps.

They moved so fast and made such a disturbance that it was impossible to count them, but there must have been considerably more than one hundred. Then suddenly, as if obeying a command, they turned, and with a wild burst of speed they headed out to sea into the setting sun.

PATSY'S CAVE

(Continued from page 358)

"That's easy," said Patsy. "And so that's how them shells got here? Why, there's nothing to it. Ya know, Doc, I used to think that stuff you talked about was crazy, but I guess it's O. K. Kinda interesting, too."

We had now been in the cave almost two hours. We were deep in the earth with solid rock overhead. Suppose the regiment be ordered to move, as regiments have a way of doing? So we turned back, picked up the jar of salamanders, and, as we neared the entrance, heard someone frantically calling for us to hurry. We reached the surface just in time to see the column getting into formation. Patsy raced to his tank and I to mine. The engines filled the air with a vibrant roar far different from the quiet solitude twenty feet below the earth. The column slowly moved by, and I saw Patsy grinning behind his goggles as his steel monster clattered along. Maybe he did not know the difference between a salamander and a lizard, but he could make a tank do an outside loop and a lot of other tricks. And that is a mighty valuable asset these days—mighty valuable!

THE SCHOOL PAGE

(Continued from page 384)

"Mr. E. Laurence Palmer;
Cornel University,
Dear Sir;

I have been informed that the Charles Lathrop Pact Trust has and is willing to help some one who has an degree in the bological and geological field, and is interisting to devot his time fulltime efforts to study with the Conservation of Education. I should like to place my application with you.

I received an A. B. Degree from ..... in June. In this degree i have a major in Chemestry, Biology and Agriculture and minor in History and English, also a pre-Med Student.

It might be of interest to you to know that i am an Assistant Biology Instructor at ..... College, this summer term.

Reference; (In the references, he spells the name of his Alma Mater's home town four different ways in six attempts and gets it right twice. He goes on:)

"I am anticapating when i can put into practice what I have learned."

Some years after I received this letter, I had occasion to visit the young man's Alma Mater and made some discreet inquiries regarding his success. I learned, without surprise, that he had developed into a highly successful high school football coach. No doubt his "boological" and English helped him in his chosen field. How did it happen that in the list of fields in which he was a specialist he did not include athletics, and how much "conservation of education" of the type he had had do we need? He was not awarded a Pack Fellowship. This was one decision that never worried me afterwards.

Look through your desk drawer to see if you too cannot find some clippings that will inspire and amuse you. And if you intend getting married, burn the old love letters, but do not burn those other gems. Possibly, you will wish to share some of your gems with me.

Useful Plants

Useful Plants of the World. By Willard N. Clute. Indianapolis. 1943. (Third Edition.) Willard N. Clute and Company. 219 pages. $3.75.

Timely, indeed, is the publication of a new and revised edition of this book by the editor of *The American Botanist.* These days we are thinking actively in terms of plants for food, and as a source of materials that may take the place of other materials cut off by war conditions. As the author points out in his preface, "the chief object has been to give the common, technical and family names of the useful species with such other information regarding them as may prove of interest to the general reader, and at the same time make it possible for the student to pursue further the subject in other books."

Birds and Man

Birds and Man. By Frank M. Chapman. New York, 1943. American Museum of Natural History. 52 pages. Illustrated.

Although this booklet—No. 115 in the Guide Leaflet Series of the American Museum of Natural History—draws its inspiration from the exhibit showing the relations between birds and man, and is, indeed, a guide to that exhibit, it seems to us that it has wider uses. Illustrated with pictures from the exhibit and with text and references, it becomes really a publication that will be of value in presenting to an audience far removed from New York City the essential facts of man-bird relationship.

HUNTING PARTNERS

By Harry L. McCready

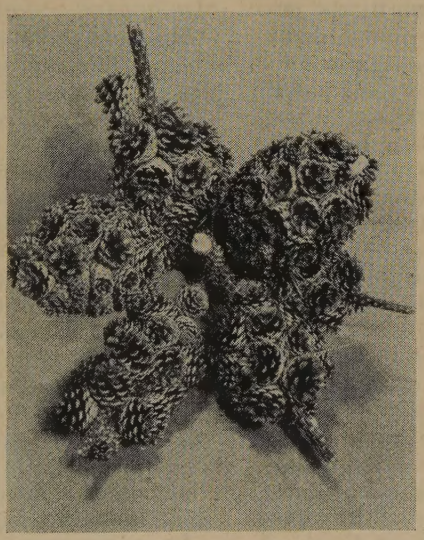
During September my wife, daughter and myself spent a couple of weeks vacationing at Tuolumne Meadows in the Yosemite National Park. Late one afternoon we drove out near the westerly end of the Meadows, left the automobile on the highway and walked over to the foot of the granite hill that rather abruptly narrows the Meadows at this end. We were searching along the foot of the rocky slope for Indian arrowheads when a coyote passed by rather closely, trotting along in the usual manner of this animal when on a foray. As all shooting is prohibited in the Park the wild animals are quite fearless of man.

We were rather surprised to see a badger following the coyote. The badger, at first, was about two hundred feet behind, but soon moved up closely to the coyote. We were watching this strange pair, and I had just finished explaining that the coyote had probably attacked the badger's young and was being pursued by the enraged animal, when the coyote bounded to one side, to a mound marking the home of a species of short-tailed ground squirrels known as the Belding ground squirrel. The badger also moved in near the coyote and began digging vigorously. There was a bit of scurrying about and then the strange pair moved on, the coyote leading with the badger close behind. They were kept under observation for about an hour and during that time covered more than a mile of distance. The order was always maintained when travelling, the coyote leading, the badger following closely with occasional stops for a foray on the ground squirrels. The animals appeared to attack the mound from two sides, and although no particular results of the hunting could be observed, a completely friendly co-operation appeared to exist. At one time the coyote was seen to sniff the badger's nose.

The evidence appeared to be absolutely conclusive—these two animals, of completely different species, were hunting partners, working together in harmony and understanding. What a hunting combination—the coyote, cleverest of animals, astute, keen-scented; the badger, the great digger!

Labrador Tea

In the article on Labrador Tea, in our April, 1943, issue, the author stated that the commercial sale of this tea had been approved by the Wisconsin and Michigan Departments of Health. This proves to be somewhat inaccurate. The Wisconsin Department of Health referred the matter of approval to the State Department of Agriculture, which gave its approval and instructions for packaging and labeling. It also referred the matter to the Michigan Department of Agriculture, which gave its approval as well. No approval was given by the Michigan Department of Health.



FREAK OF NATURE

By Edwin F. Steffek

Nature occasionally produces freak growths such as twisted trees, trees on stilts or trees with "doughnut" bends in their trunks. Perhaps even more unusual than any of these is the curious growth found in an old cranberry bog about eleven miles south of Plymouth, Massachusetts. While hunting deer in that section one day a man happened to notice a particularly dense growth in the top of an otherwise normal pitch pine. Inspecting it more clearly, it was found to be a solid mass of cones. As is shown in the accompanying illustration, each of the six branches in the whorl was completely encircled. Furthermore, each of these cones was found to be completely normal in every way except size—they were somewhat smaller than usual. In all, 208 cones were counted clustered on those six branches. How many seeds were produced is not known, but they were present and normal.

Foods from the Wild

Appropriate to these days is the March, 1943, issue of the Cornell Rural School Leaflet, written by Eva L. Gordon and entitled *Wild Foods.* No ration coupons are required for the many delectable, healthful and interesting foods that are available from the wild. Some of them are well known; more of them are not, yet deserve to be. Illustrated by drawings of the plants, the text gives concise facts about the value and habitat of the wild foods discussed. Twenty-four recipes are provided for the plants, and there are also recipes for the preparation of wild meats. A bibliography adds to the leaflet's value.

Science Dictionary

Dictionary of Science and Technology. By Maxim Newmark. New York. 1943. Philosophical Library. 386 pages. $6.00.

This volume, the title of which is descriptive, includes 10,000 current terms in the English language most frequently used in the physical sciences and their applied fields, together with separate indices in French, German and Spanish, conversion tables, and technical abbreviations.

Illinois Shrubs

Fieldbook of Native Illinois Shrubs. By Leo R. Tehon. Urbana, Illinois. 1943. Illinois Nature History Survey. 307 pages. Illustrated. $1.25.

This is the third in the series of excellent pocket handbooks brought out by the Illinois Natural History Survey. The first two dealt with wild flowers and land snails. Two hundred and ten species and twenty-seven varieties of shrubs are covered by the author. His text is supplemented by seventy-two line drawings done by Kathryn M. Sommerman. The result is a practical book for field use. Six color plates add attractiveness.

Under the Microscope

By JULIAN D. CORRINGTON

TRICHINOSIS

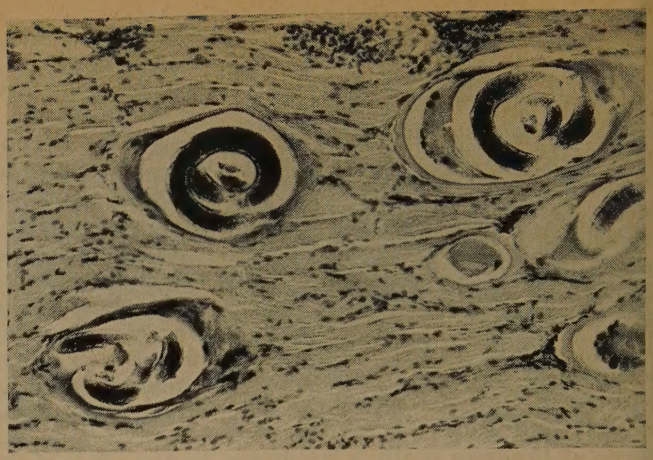
One of the most prevalent and serious of human diseases caused by worms is trichinosis; nor is this a scourge of the remote tropics or Orient—the incidence of infestation is greatest in those areas where white civilization attains its highest cultural standards—Europe and North America.

The offending organism is a minute roundworm, *Trichinella spiralis,* of the Phylum Nemathelminthes, discovered only a little more than one hundred years ago, and not recognized as an important pathogen until 1860. Male worms average 1.5 mm. in length, while females range between 3 and 4 mm. The intestinal tract of these parasites is complete, with a mouth at the smaller anterior end and an anus at the bluntly rounded and somewhat thicker posterior end. The testis in the male is single, tubular, and arises at the rear of the body, passing forward for half the length of the animal, then turning back (at a point indicated by arrow in illustrations, page 392) as the vas deferens to the small cloaca at the rear tip, which is eversible during reproduction. There are no spicules from the cloacal region, as in so many male worms.

In the female, the single ovary starts as a club-shaped body at the posterior end, continues forward as a narrow oviduct, widens into a large uterus, and opens to the exterior at the vulva, located as shown by the arrow in our illustration, at the end of the first fifth of the worm's length. These adults lie in or attached to the mucous membrane of the first part of the human small intestine (duodenum and jejunum) and, when mature, mate by means of internal fertilization, after which the males soon die. The impregnated females then reach their full size and bore more deeply, sometimes going completely through the wall of the intestine and reaching the peritoneum or lymph glands.

Unlike most helminths, whose infestations may be diagnosed by recovery of their eggs in the host feces, trichinellae are viviparous—giving birth to living young. Leuckart stated that as many as 1500 larvae may be deposited (larviposition) by each female. These highly microscopic offspring measure only 100 micra in length by 6 in diameter and will accordingly pass through either the capillaries of the lungs or the portal system of the liver. Sometimes the females are so situated as to larviposit into the cavity of the intestine, and hence such young are voided with the host feces, but more often the larvae are passed into venous or lymphatic vessels, and soon appear in the arteries as well, migrating to all parts of the body, often in immense hordes if the number of parents present is large. The mother worms live from a month to a maximum of three months, producing larvae in a continuous stream.

The larvae will develop further only in skeletal muscle and when they reach this tissue they coil up and secrete a cyst around themselves. While they may encyst in any skeletal muscle, they show marked preference for the diaphragm, tongue, larynx, abdomen, intercostals, biceps, psoas, pectorals and deltoids. It was observed that these muscles are ones of constant activity and hence poor in glycogen content, selection thus being on a physicochemical basis. Host tissues form a capsule around the worm cysts. Either the worms, the capsules, or both may later become calcified, in which case they are effectively walled off from committing further damage. Encysted worms may live for many years.



***Trichinella* larvae encysted in skeletal muscle.**

When trichinized muscle is eaten by another host, the capsules are digested by the gastric juice and, in the duodenum, the larvae are set free (excystation). Those that become attached to the intestine wall molt four times and are soon adults, ready to repeat the cycle. Two hosts are required, but they may be of the same or another species.

Man becomes infected chiefly through the medium of trichinized hogs and the principal danger lies in eating country sausage or other hog flesh that has not passed government inspection in regulated slaughter houses, and in the fondness for wurst, salame, and similar fancy pork products that may be underdone or uninspected. Thorough cooking will kill the encysted larvae, but such curing methods as smoking and salting are ineffective. Experiments have shown that drying and prolonged freezing will make meat safe. However, at the other end of the chain, farmers could wipe out this dread scourge in short order if all would cooperate by not feeding their hogs any garbage containing pork scraps, and by rat-proofing their premises. Rats constitute natural reservoirs of infection and are eaten by hogs whenever opportunity offers.

As worked out by exhaustive studies on man, the incubation period in trichinosis consists of excystation of ingested larvae (4 hours); growth and maturity to adult worms that reproduce (3d day), with nausea, vomiting, dysentery, and profuse sweating on the part of the victim; larviposition (from 5th day); and migration of larvae through the blood stream (7th day), one external symptom of which is severe edema of the patient's face. The acute stage begins around the 10th day when invasion of muscle fibers is at a maximum and fever highest. The patient suffers intense pain in all of the invaded muscles and has difficulty, often profound, in breathing, swallowing, and speaking. Larviposition decreases at the beginning of the third week and encapsulation starts at its end. By the 25th day the blood stream is largely free of the parasites, marking the onset of the chronic period. Calcification of cysts occurs from the 6th to the 12th month.

The danger to life comes from a variety of sources and varies directly with the heaviness of the infestation. The migrating larvae damage heart muscle and produce a severe myocarditis, though they do not encyst there. They give off toxins which are absorbed by the host and bring on pronounced general debility

which may lead to failure of heart or lung function, or both, and to delirium. Or the patient may contract pneumonia, pleurisy, peritonitis, or nephritis. Dehydration—that is, loss of water from the blood plasma, may be excessive. The migrating larvae may clog the vessels, causing embolism, thrombosis, or hypertension (high blood pressure). If this critical period is survived, various nervous disorders may occur during the chronic stage, such as meningitis, encephalitis, lost reflexes, hallucinations, delirium, deafness, and eye disturbances.

Altogether, the picture is a very grave one and the disease is capable of assuming epidemic proportions, with high mortality. Diagnosis is made by means of skin tests, examination of the blood, which will show a pronounced eosinophilia—that is, an increase in the number of eosinophiles up to 50% or more—and by biopsy, the examination under the microscope of tiny pieces of muscle removed from the host and compressed in a special device (trichina press) to reveal the living encysted larvae. There is no known treatment or cure. Sedatives, stimulants, purgatives, and the like, as indicated at various stages, are all that can be given the sufferer. Those who last through the active periods will gradually recover and seem to experience no lasting annoyance from the presence of the many minute cysts in their muscles.

ADVANCED HINTS

Preparations of Trichinella

One of the biggest sellers of all slides at commercial supply houses is the section of trichinized skeletal muscle to show encysted larvae, as in our illustration. The coiled larvae are usually cut into several disconnected pieces, while the cyst wall shows as well as modifications of the nearby striated fibers. Specimens of trichinized pork are obtained from officials at abattoirs, or through the aid of a veterinarian or city health officer. Autopsy human material is processed in the hospital pathological laboratory. Surest and easiest of methods for securing pieces of infected muscle, however, is from experimental feeding of laboratory rats. The material is handled like any routine histological specimen, using such fixers as Zenker's, Gilson's, or Bouin's, sectioning on a paraffin microtome, and staining with hematoxylin and eosin. The sections should be cut longitudinally.

Living larvae may be set free by digesting a small piece of fresh material, using an artificial gastric juice made by adding 2 g. pepsin and 1.3 cc. HCl to 80 cc. distilled water, and keeping at body temperature for three hours. Pipette the trichinae from the bottom of the vessel onto a slide and examine on a warm stage, or process to a balsam mount.

Adults are difficult to mount because of impermeability of the cuticle and liability of the finished worms to turn black in balsam. Glycerin or glycerin-jelly mounts are best, but not very permanent. For the average amateur, who will wish only one or a few finished slides, we recommend the following hit-or-miss procedure as shortest and least difficult. The worms are obtained from slaughter house hogs or laboratory rats and are killed in hot 70% alcohol. Stain in Grenacher's borax-carmine for 3 hours, wash in 50% alcohol, using an acid-alcohol destain if needed, dehydrate through 70, 83 and 95 percent alcohol, 30 minutes in each, then clear in beechwood creosote, 1 hour, and mount in balsam. A certain number of such mounts will turn black and opaque and these may be thrown away and only good slides retained.

American Society of Amateur Microscopists

President, Simon Henry Gage, Ithaca, N. Y.

Permanent Secretary, Julian D. Corrington, Chestertown, Md.

Official organ, *Nature Magazine*, Washington, D. C.

Address all communications concerning the Society to Dr. Corrington at Chestertown, Md. Application for Membership form sent on request.

ASAM NEWS AND NOTES

In spite of inroads upon our membership on behalf of the war effort, the Society is holding its own in excellent shape. Volume II, No. 2, of the *Bulletin* has gone to press and maintains the standard of constantly rising excellence, with many interesting articles. The Rev. John W. Baechle, charter member and a contributor to Nature Magazine, not only designed the cover, but made the photomicrograph there shown, then made the halftone cut, and had the covers printed and shipped to us with his compliments, as a contribution to bigger and better *Bulletins*. F. John Howe, of Rugby, England, writes on "The Microscopist in Medicine," Harry Ross prepared a comprehensive article on "The Technique of Arranged Slides," which the diatomists will especially appreciate, beginners are kept in mind by Jesse Edenbaum in his "Rayon Microscopy," and Rodney M. Layton considers "The Histology of Planaria." Other articles describe new kinks in staining with hematoxylin and eosin and home manufacturing of microtome, illuminator, mechanical stage, mechanical finger, and other aids. Interesting notes about the Chapters and various members round out an issue that we believe will be very well received.

TRADE NOTES

A correspondence course in clinical laboratory technique is now available and has been recommended to us by one of our A. S. A. M. members, who speaks highly of the quality of work offered. The course consists of 34 lessons, with or without practice material, depending on whether or not the subscriber has access to a laboratory. Lessons are profusely illustrated and are mailed in flexible folders, accompanied by an examination form. They deal with laboratory apparatus, microscopes, elementary chemistry, bacteriology, examination of body secretions and excretions, biochemical tests, water and food analyses, and many other topics which the hospital technician must master.

There is no time limit in which to complete the course, though the average time consumed is about ten months. Anyone interested should write for further information to Dr. William J. Byles, Director, Imperial Technical Institute, Box 973, Houston 5, Texas. Dr. Byles has recently joined our American Society of Amateur Microscopists and will be a future contributor to our *Bulletin*.

Bacteriologies may be of several different types—general, agricultural, industrial, medical—and it is well for the prospective buyer to determine which sort of book he really wishes. One of the most successful medical bacteriologies is that of Professor Thurman B. Rice, of the Indiana University School of Medicine, now in its third, revised edition, and entitled *Textbook of Bacteriology*.

The aim of the writer has been to boil down the enormous amount of material that has accumulated in recent years, eliminate superfluity, and present a

Background for the Microscope

Equipment for the pursuit of microscopy may be as simple or as elaborate as individual inclinations dictate; but there is one item wholly indispensable —*books!* The microscope is handmaiden to all the sciences, and those who follow its adventuresome trail must have many a guide to direct along the right path.

Here is NATURE MAGAZINE'S selection of best bets. Check your library and add those that fail to answer the roll call. Buy one each month, or as often as you can. Suggest them as gifts. Buy them for the relative or friend whose chief joy is working with his microscope. Entries will be changed periodically; here is a basic list for a starter:—

MICROSCOPE

The Microscope, by S. H. Gage; 17th ed., most celebrated American work; very thorough.....$4.00

The Microscope, by R. M. Allen; Excellent new manual.....$3.00

MICROTECHNIQUE

Working with the Microscope, by J. D. Corrington; New guide for self help or classroom with graded series of lessons, from single to advanced. $3.50

Adventures with the Microscope, by J. D. Corrington; An informative and interesting text for the younger hobbiest or biological student.....$5.00

Animal Micrology, by M. F. Guyer; Best general guide for histology and zoology at the college level.....$2.50

The Microtomist's Vade-Mecum, by A. B. Lee; Encyclopaedic reference, standard, advanced; botany and zoology. $9.00

PHOTOMICROGRAPHY

Photomicrography, by R. M. Allen; Splendid new work by recognized authority; complete; fully illustrated. $5.50

BOTANY

Textbook of Botany, by Transeau-Sampson-Tiffany. Beautifully designed, readable, recent.....$4.00

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College Zoology, by R. W. Hegner. Fifth Edition; most successful work of its kind; gives all main animal types and their structure.....$3.75

Animals Without Backbones, by R. Buchsbaum. Fascinatingly written and illustrated; new style invertebrate zoology.....$5.00

Man and the Vertebrates, by A. S. Romer. Companion volume to preceding; excellent general survey. $4.75

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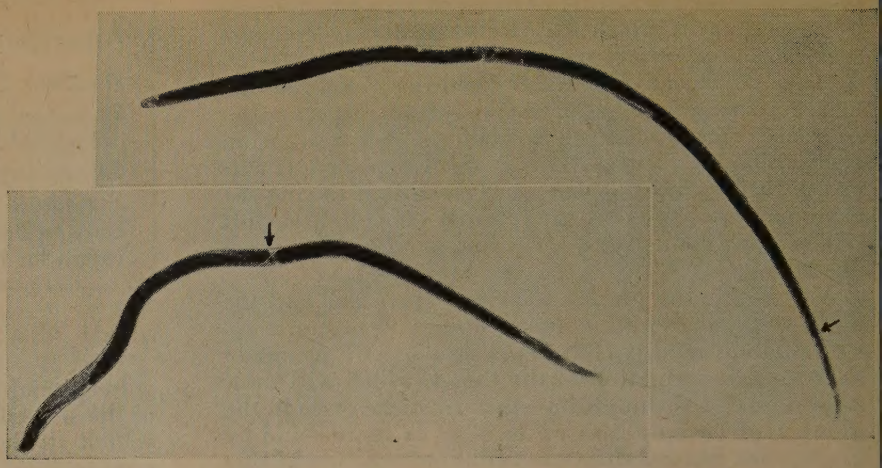

Above is the adult female of *Trichinella spiralis*, and, below, the adult male, much enlarged

concentrated dosage of those facts essential to a medical education. Thus the book is not a manual of methods or a catalog of species, but it does take up, accurately and succinctly, yet interestingly, the introductory material needed to understand the biology of bacteria, how they are handled and studied, the pathogenic species of bacteria, viruses, higher fungi, and protozoa, and such topics as immunity, serology, and sanitation. We believe the author has succeeded remarkably well in these difficult aims and has turned out a highly readable, valuable, and practical work. Pp. xii, 560; figs. 119. W. B. Saunders Co., West Washington Square, Philadelphia, 1942. $5.00.

We have noted in a previous issue that excellent British journal, still carrying on despite the war, *The Amateur Entomologist.* Recently there has arrived on our desk Vol. 6, No. 39, 1942, the entire contents of which are devoted to a single subject, subtitled "Silkmoth Rearer's Handbook." Amateur and professional entomologists alike will find this number of great value and interest. The 72 pages comprise a catalog of saturnid and related moths from all parts of the world, as well as an introductory discussion of these large moths in general, their biology, and methods used in collecting, propagating, and mounting. There are 4 plates and 22 text figures. To obtain a copy, send five shillings to B. A. Cooper, Dept. of Agriculture, The University, Leeds, 2, England.

A new edition has appeared of Professor Karl A. Stiles' *Handbook of Microscopic Characteristics of Tissues and Organs.* Retaining the excellent features that made the first printing so well received, the second edition has been completely revised and enlarged and embodies suggestions from those who used the first book. As indicated by the title, this is a volume to aid the student in the laboratory in his endeavors to master the practical details of histology and learn to recognize all of the tissues and organs at sight. Printed matter occupies the left sheets only, right ones being blank for personal notes. The type is large, clear, and varied, with boldface for headings and italics for distinguishing characters. Each tissue and organ is described in turn in outline fashion and there are numerous summary tables that contain much practical and comparative information in small space; also a table to show structures most commonly confused, a glossary, and index. Pp. xi, 204, 22 figs. The Blakiston Co., 1012 Walnut St., Philadelphia, 1943. $1.50.

Readers interested in Desmids will wish to look up a paper recently sent us by an A. S. A. M. member who is junior author of *The Desmid Genus Micrasterias Agardh in Southeastern United States,* by Gerald W. Prescott and Arthur M. Scott. This article appears in *Papers of the Michigan Academy of Science, Arts, and Letters,* Vol. XXVIII, 1942. Published 1943. Pp. 67-82; plts. I-VI, figs. 2. It deals with a survey of *Micrasterias* in the specified region, with an annotated list and remarks on the biology of desmids in general and this genus in particular. A number of new varieties are established.

The National Association of Biology Teachers began a new year on July 1, and will continue to publish eight issues per year of its splendid journal, *The American Biology Teacher.* Dues, including subscription to the magazine, are $1.50 per year. Address Miss Marie Knauz, Peabody High School, Margaretta St., E.E., Pittsburgh.